THE

# AMERICAN REVIEW OF TUBERCULOSIS

## ABSTRACTS OF TUBERCULOSIS

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**Damaged Lungs and Bronchiectasis.**—Very commonly some permanent damage remains as the sequel to pulmonary inflammation, the end results showing themselves in fibroid lung, simple bronchiectasis, or both. The more severe and prolonged the original attack the greater, as a rule, the disability. The lesser degrees of damage are readily overlooked, or mistaken for pulmonary tubercle. It is in the early years of life that most cases originate. In childhood case histories show clearly the common origin of lung damage in the inflammatory lung diseases of childhood, especially the infective catarrhs or measles and whooping cough, in connection with which American investigators have recently associated a definite thickening of lung shadows by X-ray. Bronchopneumonia, however, stands out in childhood as the prime cause of lung damage, and two other causes should be added, namely, influenzal pneumonia and tuberculosis. The latter may be an object of scepticism to many who still hold desperate views as to the mortality of this disease in the young, but the X-rays furnish convincing evidence of the recoverability of pulmonary tuberculosis even in infancy, some signs of the lung damage generally remaining behind. In the type of case developing after bronchopneumonia the child may appear well and vigorous, but all signs do not clear up, and later further attacks, perhaps milder, may occur, possibly due to an acute catarrh of the dilated bronchioles, with some surrounding congestion but no true pneumonic consolidation. A slight clubbing of the fingers or curving of the nails may help us to suspect the true state of affairs. Another common type of case simulates pulmonary tuberculosis, especially when there are areas of impairment at the apex, with crepitations. The children, however, are much less ill than they would be with tuberculous lesions of similar extent, and their history and course are similar to the foregoing type. Such cases originate probably in apical lobar pneumonia. Where bronchiectasis involves the larger bronchi no added sounds may be audible or only a few coarse râles; where the smaller bronchi are affected we may find breezy consonating crepitations, sounding very superficial; when a lung from such a case can be viewed at autopsy table it shows a reticulated appearance due to development of numerous bronchiolar sacs. Many such cases of bronchiectasis, in which physical signs fail to clear up, leave our children's hospitals, and it may well be asked what becomes of them. Perhaps some ultimately recover, others return with catarrhal recrudescences, while others, without marked impairment of health, carry their pulmonary damage into adult life. The symptoms are variable: some cough, and may bring up sputum or blood, but few appear really ill except during the febrile attacks to which a proportion are prone. In adult life "damaged lungs" are commonly the residuum of inflammatory diseases in childhood. Cases of "basal bronchitis" are observed, strictly confined to the bronchopneumonic area, and these are believed to be cases of bronchiolectasis derived from a childhood bronchopneumonia; although little real proof is available, the history frequently suggests this. Primary bronchopneumonia, apart from influenza, is probably rare in adults. An older relative may often be helpful in recalling early attacks of illness. As in children, hemoptysis is not infrequent and of course leads to a suspicion of tubercle. In addition to damage from childhood infections, the lungs of adults may suffer scarring from either recovered influenzal pneumonia or tuberculosis. Basal bronchiectasis or bronchiolectasis has certainly increased since the

recent epidemics. Regarding lung damage due to healed tuberculous lesions, some amount of bronchiectasis is the usual accompaniment of chronic pulmonary tuberculosis. The presence of crepitations over the diseased areas in arrested or healed cases is common; they may represent the dry crackles of expanding lung, but where they are somewhat moist they are probably due to dilated bronchioles in a contracting fibroid area. In such cases the "reflex bands of percussion impairment," elsewhere described, are absent. Finally, it should be emphasized that the textbook account of bronchiectasis applies only to a few marked and unusual cases, whereas the slighter forms are not rare and are seen at all ages; the latter provide us with problems in diagnosis, prognosis and treatment which may be of vital importance to our patients and our reputation.—*Damaged Lungs and Bronchiectasis, C. Riviere, Brit. M. J., January 28, 1923, no. 3239, 141.*

**Surgical Treatment of Pulmonary Gangrene.**—Laennec differentiated two forms of pulmonary gangrene, namely, the circumscribed and diffuse types. The change from solitary to multiple gangrene may occur rapidly. Therapeutically, this is important. In a case of severe, progressive, gangrene of the right upper lobe, which rapidly spread, a total thoracoplasty was performed in two stages, in the hope of arresting the process. The condition of the patient improved after the operation and the amount of sputum diminished. The fetid character of the sputum finally disappeared, and with it bacteria, spirilla and elastic fibres. The temperature dropped to normal. Upon discharge the sputum amounted to 20 cc. and was mucopurulent, but contained no microörganisms or elastic fibres. Usually total thoracoplasty has been used in chronic fibroid tuberculosis to cause contraction and fibrous tissue formation, but in gangrene its purpose is mainly to induce collapse, thus preventing further spread of the infection.—*Beitrag zur chirurgischen Behandlung der ausgedehnten einseitigen Lungengangrän, O. Ziegler, Beitr. z. Klin. d. Tuberk., March, 1922, l, 395.*

**Primary Carcinoma of Lung.**—Squamous metaplasia of the bronchial mucosa is a not uncommon occurrence in tuberculosis and other pulmonary lesions. As a result, a certain number of carcinomata arising from the bronchial mucous membrane are definitely squamous in type. In a few instances there was a mixture of squamous and columnar cells in the primary tumor, showing that metaplasia may take place in the established tumor. The case reported in this article is of interest owing to the fact that in the primary lung tumor, although this was preceded by a tuberculous lesion, there was no evidence of cell metaplasia; such a metaplasia was, however, well seen in certain of the metastases, notably those to the voluntary muscles and skin. The distribution of the secondary growths is also of some interest. Adler (1912) reported that the liver is invaded in 28.5 per cent, the adrenal in 10 per cent, and the voluntary muscles in 2 per cent of cases. In the case reported, secondary metastases were absent from the liver but were found in the pancreas, both suprarenals, kidney, skin and voluntary muscles. Suzuli (1918) was able to collect only 115 cases of multiple skin metastases from cancer of internal organs, while in only three of these was the primary growth in the bronchus.—*A Case of Primary Carcinoma of the Lung, H. J. C. Gibson and G. M. Findlay, Lancet, January 6, 1923, cciv, 21.*

**Immobility of Diaphragm.**—In empyema of the child, fixation of the diaphragm is much less frequent than in the adult. The tendency to more rapid recovery is apparent, and the resultant damage less, with the exception of the involvement of the pericardial pleura and the displacement of the heart. Recovery is often accompanied with a hopelessly incompetent heart. Immobility of one leaflet of the diaphragm followed empyema in the child in about 50 per cent of those observed. After recovery the leaflet may be mobile or restricted in action for months and later show complete loss of motion. In the adult empyema is a far more serious disease and the probability of the crippling of the leaflet of the diaphragm on the affected side is decidedly increased. Of 50 patients, observed from three months to eight years after recovery, only 8 revealed no evidence of loss of motion, flattening of the dome, or obliteration of the cardiac or costal sulcus. Accumulated experience during the last six years has strengthened the opinion that consequent adhesions to the pericardium and malposition with occasional surprising twists of the heart form a very important factor in the results and explain symptoms often overlooked or ascribed to other causes. Pericarditis occurs much more frequently as a complication of empyema and pleurisy than is commonly supposed. When the results of pleurisy with effusion are compared with those of empyema they are found to be more encouraging. Thus, about 80 per cent of the group with effusion revealed loss of motion or varying degrees of restriction, loss of the curve of the

dome or obliteration of the cardiac or costal sulcus. Exudate and residue in the sulci are responsible for some of the adhesions and contractions, but they do not account for the changes that take place in the diaphragm. It is impossible to remove all the fluid in the pleural cavity by aspiration. A dry pleurisy may produce immobility. The results of pleurisy with effusion and pulmonary tuberculosis differ but slightly from those with simple pleurisy with effusion. About half the number were followed with complete immobility of the leaflet, and only about twenty five per cent had full normal motion with no apparent involvement of the dome and sulci. The frequency of effusion following artificial pneumothorax is reported by all conscientious observers, but the remote danger of crippling the diaphragm seems to be generally disregarded. The diaphragmatic involvement following pleurisy is not always limited to one side. More than one-half of those examined during deep inspiration and expiration exhibited less than normal motion with changed configuration of the dome on the opposite side. When half of the diaphragm was fixed and the pericardium displaced and adherent the other half was found, in a number of cases, much restricted and the dome absent. In pleurisy with effusion and empyema the diaphragm and the pericardium are always involved to a greater or less extent, usually however with remarkably little symptomatic disturbance. There are notable exceptions and invalidism may follow for an indefinite time. The grave danger lies in the fact that a very small number of cases may develop disease on the opposite leaflet and bilateral immobility may ensue. Five cases with this complication are reviewed. In three the disease was of about a year's duration. In these three, loss of appetite and weight, anemia, weakness and excessive dyspnea on slight exertion were noted. There was no fever, cough or expectoration. The blood pressure was low and the heart sounds weak. After a short period of complete rest the difficulty in breathing would subside. Fluoroscopic examination revealed complete diaphragmatic immobility. The heart was narrow and misshapen and the pericardium appears to have been pulled down and stretched until the heart, deprived of its natural space by pressure and elongation, had been forced to assume a shape never previously perceived and to the author's knowledge never described. One died in three months, one in seven months and the other in two years. In two the disease developed after the institution of artificial pneumothorax. One should know to a certainty whether one leaf of the diaphragm is incompetent before daring to undergo the risk of irreparably impairing by pneumothorax the remaining portion. The distressing invalidism is unquestionably due in a large degree to respiratory and circulatory failure. This hitherto undescribed clinical entity, characterized by a definite and distinctive complex, designated phrenocardiac incompetence, should be recognized and accepted if further investigation by others substantiate this conclusion. Given a patient with a rare and distinctive picture of dyspnea, cardiac area remarkably diminished, apex beat difficult or impossible to discern, heart sounds very faint, very low blood pressure and vital capacity, anemia, gradual loss of weight and strength, costal breathing, absence of Litten's sign, a history of pleurisy, one-sided or bilateral pulmonary tuberculosis, particularly of the fibroid variety, sometimes a history of artificial pneumothorax, one should look for X-ray proof of cardiophrenic disease. A diversity of opinion seems to exist as to the cause of diaphragmatic immobility. Pathologists have added but little to our knowledge. A plan of research that is being carried out on this subject is outlined.—*Immobility of the Diaphragm with Report of Cases of Bilateral Immobility, J. H. Pryor, N. York M. J. & Med. Rec., January 17, 1923, cxvii, 75.*

**Lymphatic Involvement in Infection.**—It has been said that an infection disseminated by the blood is less dangerous than one spread by way of the lymphatics, because in the former instance the whole blood force of the body acts upon it quickly, whereas in the latter, if it is not overcome in the lymph nodes, the toxic agent may enter the blood more or less continually and occasion perhaps an incurable infection. The relation of the lymphatics to the ultimate prognosis in tuberculosis, syphilis and cancer is discussed. Emphasis is laid on Cohnheim's original observation that the sentinel lymphatic node first showing enlargement points to the course of the infection. Many believe that in tuberculosis, if the primary focus where the bacilli become acclimatized and first involve the lymphatic system can be removed, the secondary processes will thereby be rendered much more amenable to treatment. Surgical experience gives some stability to this opinion. This also applies in some degree to syphilis. The curability of cancer depends more on the lymphatic involvement (the lymphatic richness of the part affected) than on any other one factor. For instance, in from 80 to 85 per cent of all cases of cancer of the body of the uterus, which is poor in lymphatics, hysterectomy

results in five-year cures. The toxic agents are commonly distributed in three ways, namely, through the blood, which is exceedingly rapid, through the lymphatics which is slower, and by local extension from a pathological lesion. The walls of the capillaries are normally pervious to oxygen and crystalloid substances soluble in water. The lymphatics are concerned with the absorption of solids and material insoluble in water. The influence of secondary septic infection on the lymphatic manifestations of tuberculosis, syphilis and cancer can hardly be overestimated. It is very important that all foci of infection in the tonsils, teeth and so forth be eradicated in the tuberculous patient. In cancer, the prospect of successful glandular defense against the extension of the disease is exceedingly small. The cancer cell left to itself eventually destroys its host, unlike the bacillus of tuberculosis and the spirochete, which can live only in the living; hence, invariable destruction of their hosts would mean eventual extinction of the infecting agents.—*The Significance of Lymphatic Involvement in Infections, W. J. Mayo, J. Am. M. Ass., January 27, 1923, lxxx, 221.*

**Effects of Vaccinia on Leprosy.**—At the Kalihi Hospital for Lepers at Honolulu, Hawaii, there were 219 patients at the time this study was made. Of these all save 45 had vaccination scars. Twenty-seven of the 45 were chosen for vaccination against smallpox; the remaining 18 served as controls. Vaccination was successful in 19 and not successful in 8 cases, and of the 19 successful cases 11 developed acute leprous eruptions in the two weeks following vaccination; the remaining 8 had no such exacerbations. Among the 8 cases unsuccessfully vaccinated none showed any change in his leprosy. The acute leprous eruption following the vaccination resembled entirely the ordinary acute eruptions seen in the course of treatment of leprosy and was associated with constitutional symptoms. The acuteness of the swollen, painful, reddened local lesion, as well as the symptoms, began to abate with the subsiding of the vaccinia and had disappeared in all cases one month after vaccination. It seems that the anesthetic type is affected little, if at all, by vaccination, but both the nodular and the mixed types especially the latter, are affected. Two of the 149 leper patients who had good vaccination scars developed transient "increased activity, evidenced by eruptions, during the same period."—*The Effect of Vaccinia on Leprosy, H. E. Hasseltine, U. S. Pub. Health Reports, January 5, 1923, xxxviii, 1.*

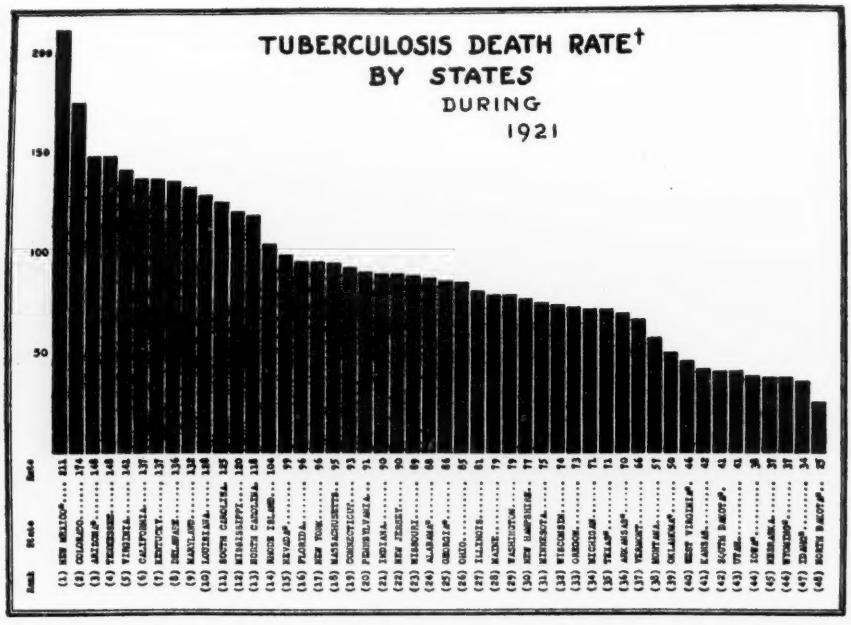
**Effects of Vaccinia on Leprosy.**—At the United States Marine Hospital (National Leprosarium, Carville, La.) 118 leper patients and 105 nonleprous attendants were vaccinated against smallpox. Of the 118 lepers, 79 were successfully vaccinated; of the 105 nonleprous persons, 74 were successfully vaccinated. The local reaction in the leprous was usually quite intense and in 11 cases produced alarming symptoms. The reactions resembled the acute exacerbations ordinarily seen in the course of leprosy. Widespread inflammation and marked pain frequently called for complete immobilization and rest in bed for one to three weeks. The involved area was indistinguishable from macular leprous lesions. In the nodular type, many new tubercle-like nodules developed about the point of vaccination and, later, in previously unaffected areas of the body. These were associated with severe systemic symptoms. In the maculo-anaesthetic type neuritis often appeared, usually in the vaccinated arm but sometimes in both or only on the side opposite; there was fever and the entire appearance was that of "ulnar neuritis and so called 'leper fever.'" This neuritis commonly lasted only about three or four days. The cases of the mixed type "showed a combination of the reactions described as occurring in" both preceding types. In 13 of the unsuccessfully vaccinated lepers there were reactions similar to those described, but less intense. The majority of the lepers showed abnormally severe vaccinal reactions which provoked the "appearance of definite leprous lesions," and profoundly affected the normal course of leprosy. Large numbers of the Hansen bacilli were found in the lesions at the height of the reaction. Certain reagents, such as iodides, ethyl esters of chaulmoogra oil and various vaccines sometimes elicit reactions in lepers. None of the vaccinated lepers with leprous exacerbations was any worse for the experience; some showed an improvement.—*Specific Leprous Reactions and Abnormal Vaccinia Induced in Lepers by Smallpox Vaccination, O. E. Denny and R. Hopkins, U. S. Pub. Health Reports, December 22, 1922, xxxvii, 3141.*

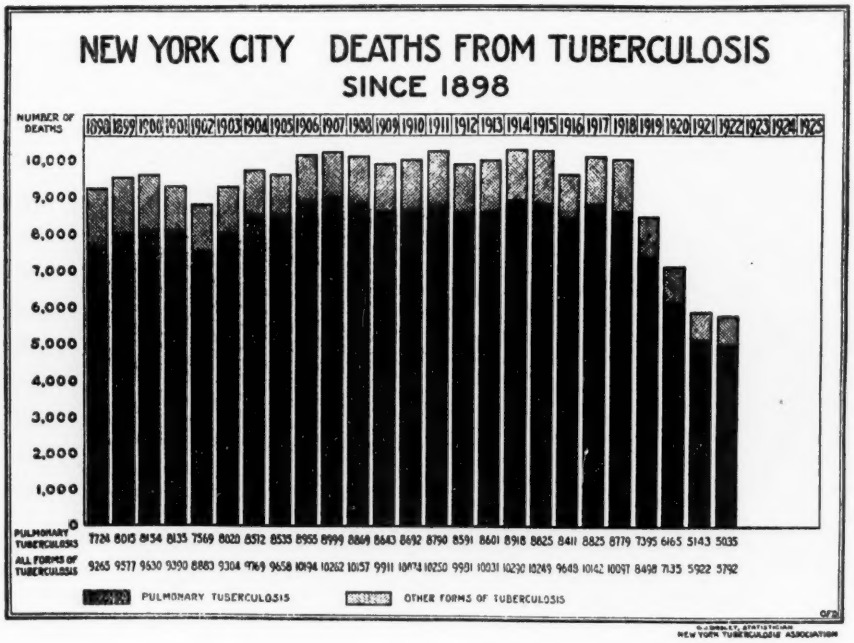
**Tumor of Thymus Associated with Tuberculosis.**—The patient, a man, aged forty, had moderately advanced pulmonary tuberculosis. Six weeks after a sarcomatous nodule appeared on the anterior chest wall he died; from the clinical course and the autopsy findings a primary tumor of the thymus, classified as a lymphosarcoma, was diagnosed. The most important question was the relation of the tuberculosis to the tumor formation. Many of these tumors are

said to be of granulomatous origin. It is, therefore, not unreasonable to suppose that the tuberculosis, though in itself insignificant, incited the cells of the thymus to malignancy. The rapid course of this type of tumor is typical and there are no successful means of treatment. The tumors are not difficult to differentiate from any other glandular involvement of the mediastinum, with the possible exception of the type that resembles Hodgkin's granuloma. They grow by direct extension more than by metastasis.—*Primary Tumor of the Thymus Associated with Tuberculosis, H. C. Sweany, J. Am. M. Ass., March 17, 1923, lxxx, 754.*

**Tuberculosis and Some of Its Past Investigators.**—The discovery of the communicability of tuberculosis by Villemin in 1865 and the tubercle bacillus by Koch in 1882 laid the foundation for all subsequent investigation and for all our knowledge in prevention. Pirquet's discovery of the test that has been named after him ranks second only to that of the bacillus. By it he and others have been able to demonstrate the almost universal distribution of the disease, and from this knowledge all our modern instrumentalities for protecting the health of the child, such as nutrition clinics, preventoriums and open air schools have been developed. Theobald Smith differentiated the bovine from the human bacillus and subsequently came our care and regulation of milk and cattle. The Framingham Health Demonstration, a piece of research work, has resulted in giving us highly effective means of combating tuberculosis in any community, and of affording timely treatment to those that are suffering from the disease, and of protecting those exposed to it from becoming infected. George Bodington, in England, started the first open air treatment but was ridiculed out of it by his colleagues; however, it was the beginning of the work that Brehmer carried out in the Silesian mountains and which is now the commonly accepted mode of treatment. It was from Dettweiler that the idea of the great importance of rest developed. Forlanini, an Italian physician, conceived the idea of putting the lung to rest by means of collapsing it with air or gas and in 1882 he tried his first experiment. Heliotherapy is an age-old panacea but, following the intelligent experimental work of Rollier in Switzerland, we have been able to greatly benefit cases of surgical tuberculosis, especially in children. What we are all looking for is some vaccine or serum which may render us immune against tuberculosis as vaccination does against smallpox.—*What We Owe to Past Investigators for Our Present Methods of Prevention and Treatment of Tuberculosis, E. O. Otis, Boston M. & S. J., January 18, 1923, clxxxviii, 59.*

**History of Tuberculosis.**—The development of our knowledge of tuberculosis is reviewed and a critical analysis of different views on various phases of the subject, as they were put forward from time to time, is presented. Reviewing the advances made in the treatment of pulmonary tuberculosis in the last forty years, three methods alone stand out as new departures that have attained to some measure of success. These are, in chronological order, the sanatorium method, tuberculin, and the induction of artificial pneumothorax. It must be confessed, however, that the failure of tuberculin has been a great disappointment. The sanatorium method has given better results than any other so far, although some modifications of the original sanatorium routine have been found necessary. For instance, the excessive feeding insisted upon by Walther of Nordrach and many of his disciples has proved to be unwarranted and even harmful in many cases. One of the great merits of sanatorium life consists in its educational effects, not only on the inmate himself, but also indirectly on his family and acquaintances, and some of the credit of the improved state of public opinion must be assigned to the influence of the sanatorium movement. If further experience should justify the sanguine opinions currently expressed, the induction of artificial pneumothorax will rank among the greatest advances in the treatment of pulmonary tuberculosis. An increased knowledge of the disease would be expected to be reflected in a decreased morbidity, but it has been clearly shown that the mortality had begun to fall before the general recognition of the infectious nature of tuberculosis could have had any influence on prevention or treatment. Progress in general hygiene and an improved standard of living have, no doubt, contributed to the reduction of the tuberculosis death rate. Segregation of advanced cases would insure further progress but, since this is at present not feasible, an effort must be made to increase the partial immunity already acquired by a large proportion of the population. This will probably be accomplished by the discovery of biochemical conditions which favor immunity. Tuberculosis can never be completely exterminated, but in the future much will be done to bring it under better control.—*Schorstein Memorial Lecture on a Retrospect of Forty Years in the History of Tuberculosis, P. Kidd, Lancet, December 9, 1922, cciii, 1207.*


TUBERCULOSIS DEATH RATE†
BY STATES
DURING
1921
200
150
100
50
Rank
Rate
(1) NEW MEXICO* 211
(2) COLORADO 174
(3) ARIZONA* 148
(4) TENNESSEE 148
(5) VIRGINIA 142
(6) CALIFORNIA 137
(7) KENTUCKY 137
(8) DELAWARE 136
(9) MARYLAND 135
(10) LOUISIANA 128
(11) SOUTH CAROLINA* 125
(12) MISSISSIPPI* 120
(13) NORTH CAROLINA 118
(14) ROOD ISLAND 104
(15) NEVADA* 99
(16) FLORIDA 96
(17) NEW YORK 96
(18) MASSACHUSETTS 95
(19) CONNECTICUT 93
(20) PENNSYLVANIA 91
(21) INDIANA 90
(22) NEW JERSEY 90
(23) MISSOURI 89
(24) ALABAMA* 88
(25) GEORGIA* 86
(26) OHIO 85
(27) ILLINOIS 81
(28) MAINE 79
(29) WASHINGTON 79
(30) NEW HAMPSHIRE 77
(31) MINNESOTA 75
(32) WISCONSIN 74
(33) OREGON 73
(34) MICHIGAN 71
(35) TEXAS* 71
(36) ARKANSAS* 70
(37) VERMONT 66
(38) MONTANA 57
(39) OKLAHOMA* 50
(40) WEST VIRGINIA* 46
(41) KANSAS 42
(42) SOUTH DAKOTA* 41
(43) UTAH 41
(44) IOWA* 38
(45) NEBRASKA 37
(46) WYOMING* 37
(47) IDAHO* 34
(48) NORTH DAKOTA* 27


NEW YORK CITY DEATHS FROM TUBERCULOSIS
SINCE 1898
NUMBER OF DEATHS
1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
PULMONARY TUBERCULOSIS 7724 8015 8154 8135 7569 8020 8512 8535 8955 8999 8869 8643 8692 8790 8591 8601 8918 8825 8411 8825 8779 7395 6165 5143 5035
ALL FORMS OF TUBERCULOSIS 9265 9577 9530 9390 8883 9304 9769 9658 10194 10262 10157 9911 10074 10250 9901 10031 10290 10249 9648 10142 10097 8498 7135 5922 5792
PULMONARY TUBERCULOSIS
OTHER FORMS OF TUBERCULOSIS
O'D
NEW YORK TUBERCULOSIS ASSOCIATION

**"Koch's Disease "**—A new term, Koch's disease, is introduced. The author defines it as a symptom-complex produced by the remote action of tuberculous toxins on the body as a whole. This toxic effect occasions an increased hypersensibility of the body to various pathological conditions. The whole field of phthisiology is thus divided into Koch's disease, the systemic and the focal tuberculosis, and tuberculosis of different organs. The symptoms of Koch's disease can be divided into three classes: (1) general symptoms, such as anemia, feeling of lassitude, disturbances of the vasomotor, thermoregulatory and nervous apparatus; (2) mucous membrane symptoms, heightened hypersensitiveness of the mucous membranes caused by the excretion of tuberculous toxins, such as rhinological, inflammatory, lymphatic and arthritic diathesis and inflammatory processes of neuroallergical nature; (3) specific symptoms, presence of a tuberculous focus in the body, the tuberculous local effect, as is the case in tuberculous cervical adenitis, bronchial and hilum tuberculosis and tuberculosis of the mesenteric nodes. The differential points are the striking difference between the negative objective findings and the subjective symptoms, periodic appearance without any demonstrable cause of subjective complaints, refractoriness to medicinal treatment and the tuberculin reaction, in which case the subjective complaints either may be aggravated or almost completely disappear.—*Die Wirkung der Tuberkulosegifte auf den menschlichen Organismus insbesondere auf die Schleimhäute—Die Kochsche Krankheit, E. Schulz, Ztschr. f. Tuberk., November, 1922, xxxii 100.*

**Classification of Tuberculosis.**—Statistics of therapeutic results are valueless unless the anatomic character of the pulmonary disease is taken into account in classifications of tuberculosis. The developmental stages, according to Ranke, open new avenues for the clinical study and immunity interpretation of the disease. By roentgenological studies it is possible to differentiate the various developmental forms of pulmonary tuberculosis. The healing of the primary nodule is the rule and in this the suckling period is generally no exception. In the stage of generalization (secondary tuberculosis) the lungs are more frequently affected than previously thought. Endogenous reinfection of the lungs in the secondary period expresses itself roentgenologically in varied forms. The appearance of the isolated tertiary pulmonary focus in the organ of primary infection is immunobiologically incomprehensible.—*Zur Einteilung der Tuberkulose, Harms, Beitr. z. Klin. d. Tuberk., March, 1922, l, 271.*

**Clinical Classification of Pulmonary Tuberculosis According to Anatomic Forms.**—Only within recent years have attempts been made to classify pulmonary tuberculosis according to anatomic forms. The most serviceable classification has come from the Aschoff Institute. The classification of Fränkel and Gräff has been modified, in that the elaborate divisions (apical field, upper field, middle field, and lower field) are given up for the pulmonary lobe divisions. On the basis of this classification a large material has been examined and as a result of this the scheme has been modified to make a simple practical form. The following forms proved practical and sufficiently extensive: *Group 1:* Exudative phthisis: (a) lobar caseous pneumonia (peracute), (b) lobular caseous pneumonia (acute to subchronic); *Group 2:* Productive tuberculosis: (c) nodose phthisis (chronic), (d) cirrhotic phthisis (exquisitely chronic). The anatomic, roentgenological and clinical behavior of productive and exudative forms are dealt with. Productive tuberculosis occurs only after the third stage (Ranke). The anatomic prototype is the tuberculous granuloma that, on the one hand, tends to fibrous induration and, on the other, to caseate and soften. Productive nodose tuberculosis originates at the apices almost entirely. The first foci are either strictly apical or paravertebral, but they can occur subapically, especially in the so called subclavicular triangle. Spread occurs as an apical-caudal development, in the primarily as well as in the secondarily involved lung, in which the size and density of the lesions increase from above downward. The course of fibrous induration and caseation and softening proceed in this direction also. The size of the lesions is not uniform, thus differing from those of miliary tuberculosis. The disseminated small and large nodular forms belong to the chronic indurative type. In individual cases the tuberculosis develops more in a ventral direction. The process, therefore, reaches the lower border anteriorly earlier than posteriorly, during which, not rarely, the entire upper lobe is attacked earlier than the top of the lower lobe. The roentgen pictures and the physical findings give corresponding pictures. Cirrhotic phthisis can be looked upon as an individual disease entity. Nodular cirrhotic forms, such as Gräff and Küpferle describe, originate from an apparently healing large nodular productive tuberculosis, in which the collapse induration of small atelectatic areas, lying between acinous productive nodules, plays a part. Perivascular and peribronchial connective tissues grow early and unite with strands, extending from the thickened subpleural scar tissue, to form a confluent cirrhosis. The basic process is almost en-

tirely a productive tuberculosis, and localization is in the right or left upper lobe. Contraction of the thorax is not due to the cirrhosis, but is to be attributed to fibrous pleuritis. The contraction can naturally have a widespread influence (causing a vicarious emphysema). If the emphysema does not compensate sufficiently there can occur evident changes in the diaphragm and liver. The roentgen picture shows confluent shadows in the apex and upper lobe. The shadow tends to be sharply demarcated and the deposits are pathognomonic of confluent cirrhosis. The picture of an exudative phthisis is always, anatomically, one of pneumonia. It begins almost always as a disseminated lobular involvement and tends markedly to confluence, with transformation to a lobar caseous pneumonia. It begins usually centralward. The peracute forms pursue a rapid course. The subacute forms, on the contrary, show only minimal lung tissue remnants, resulting from the slow but markedly destructive processes. The caseous aspiration pneumonias occur mainly in the vicinity of bleeding foci or in the lower lung areas. The roentgen picture of exudative phthisis reveals outspoken white, not sharply defined, round shadows, overlapping and blending. The spots become confluent in the middle, in contradistinction to productive tuberculosis, in which they increase from above downward. Physically, lobular caseous pneumonia is like acute bronchopneumonia. Some pathologists believe that exudative processes are associated with older productive lesions. This was found to be true in only a small portion of the cases. Both processes are most commonly found side by side, one or the other predominating, or are equally prevalent, both being definitely separated or of mixed type. The relation between the course of the tuberculosis and the protective mechanism is discussed.—*Klinische Einteilung der Lungentuberkulose nach den anatomischen Grundprozessen, H. Ulrici, Beitr. z. Klin. d. Tuberk., March, 1922, li, 63.*

**Education of Tuberculosis Patient.**—If a patient has early tuberculosis and is "only slightly febrile," many physicians think that, after a month's stay at a sanatorium in order to learn how to live, he can return home and successfully combat his disease. But the important point is that the patient has a very real, insidious and dangerous complaint and that the function of the sanatorium is to treat the disease and, if possible, to arrest its activity. During his stay in the sanatorium the patient has to learn, not so much how to live if by that is meant the value of an open window and the disadvantages of late hours, dissipations, etc., but how best to control the attacks of the tubercle bacillus, how to restore the balance between these attacks and his own natural resistance, and then, and then only, how to order his life under home conditions. He must learn something of the causes and pathology of the complaint. In this respect the more the patient is taken into the physician's confidence, the more confidence he will have in the physician's directions. The risk of frightening the patient is not to be considered too seriously, since a little salutary fright may afford a proper stimulus for the patient to take the necessary steps. He should be informed about the infectivity of the disease and the means of prevention. The principles of treatment should be explained in detail and certain facts regarding the more typical symptoms of the disease should be elucidated, remembering the patient's influence as a walking advertisement and an agent of propaganda after he leaves the sanatorium. After the patient's discharge from treatment, a continuance of good health is usually a matter of ample financial resources, self-control and a prudent disposal of out-of-work hours.—*The Education of the Tuberculous Patient, H. O. Blanford, Brit. J. Tuberc., January, 1923, xvii, 24.*

**Future of Tuberculosis Movement.**—Under this heading a symposium of nine short articles is presented in which the various authors indicate certain defects in the present scheme, especially as applied in England, and point the way in which future advances are likely to proceed.—*The Future of the Tuberculosis Movement, Brit. J. Tuberc., January, 1923, xvii, 1.*

**Factors Influencing Antituberculosis Campaign.**—Once a diagnosis of tuberculosis is made, the patient ceases to be the concern of the doctor only; he also demands the attention of the lawyer, the economist, the administrator and the philanthropist, but none of the latter can hope to deal successfully with the problems laid before them except in the light of well informed and carefully thought out medical advice. This enforced coöperation between men of different training often leads to difficulties, since the layman may exceed the limitations of his particular training, while the physician may, wittingly or not, assign the semblance of fact to what is later proved to be fallacy. For this reason we need to reëxamine the foundations of definite knowledge upon which tuberculosis schemes are or should be built, in order that we, as a profession, may

speak with the force of unanimous conviction, where this is justifiable, and may agree to qualify our opinions as tentative only where finality has not yet been reached. In the matter of tuberculous infection, for instance, the causative agent is known; also the proper mode of cultivation, many of its properties, and probably its varieties. The exact mechanism of infection is unknown but close contact with open cases is the outstanding source of danger to the healthy. Further investigation is necessary to determine to what extent phthisis depends on reinfection from without. Available evidence, which is not conclusive, suggests that such reinfection, though more difficult than primary infection, is not only possible but frequent; that slight reinfections are overcome; but that repeated and massive reinfections are very serious, especially for those whose initial infections have been small, infrequent, and remote in point of time. Research is also needed to find the cause of variations in the clinical picture of tuberculosis and to lay bare the physiological secrets behind the phenomena of nutrition that influence resistance. Inheritance and diet are claimed to play a part in resistance, and there can be no reasonable doubt that acquired immunity is largely responsible for the falling tuberculosis death rate. There is an urgent need for the investigation of the question whether the ingestion of milk infected with bovine tubercle bacilli plays a rôle in vaccinating us against human tubercle bacilli. It has already been shown that calves can be immunized against the bovine type by previous inoculation or feeding of the human type. Epidemiological evidence suggests that the bovine type is capable of immunizing the human subject against the human type but such an important question requires a definite answer before any tuberculosis scheme can be considered perfect. It is also essential to study more fully the epidemiology of tuberculosis among the inhabitants of isolated communities.—*The Need of Research in Framing Tuberculosis Schemes, S. L. Cummins, Lancet, January 27, 1923, cciv, 165.*

**Reasons for Failure in Solving Tuberculosis Problems.**—A disease may be viewed in three aspects: (1) the agent, (2) the disturbance of function and (3) the damaged organ. Tuberculosis workers have carefully studied the damaged organ and the etiological agent, but practically no attention has been given to the living, reacting human body. Such an important symptom as malaise is often only vaguely understood by medical men; this term describes a combination of symptoms, including loss of the sense of well-being, the presence of the sense of exhaustion at rest or on slight exertion, loss of appetite and, it may be, chilliness, sweating, etc., while, accompanying these sensations, there is often pallor, increased pulse rate and wasting. Practically nothing is known of the mechanism of these phenomena. But there are even simpler disturbances of which we are ignorant. We know little, for instance, about how tubercle bacilli get to the lymph node, and we do not understand the principles of development or hypertrophy of lymph nodes. In the matter of treatment, empiricism may be defined as the employment of a remedy, of the actions of which we are ignorant, for a disease, the nature of which we do not understand. Rational or scientific treatment means, on the other hand, the recognition of the symptoms of ill health, with knowledge of their mechanism and prognostic significance, and the employment of a remedy whose action on the sick human body we know and understand. The history of tuberculosis reveals a record of attempts at cure which reflects little credit on the medical profession, and it well illustrates the waste of energies wrongly directed. Instead of strenuously seeking to understand the nature of the patient's ill health, modern medicine is content still to flounder along in vain search for a "cure."—*Some Reasons for Failure in Solving Problems Connected with Tuberculosis, J. Mackenzie, Brit. J. Tuberc., January, 1923, xvii, 12.*

**Notification of Tuberculosis in England.**—In 1899 voluntary notification of pulmonary tuberculosis was introduced locally in Brighton and Manchester. General compulsory notification was introduced tentatively in 1908 but complete notification was not enforced until 1913. The system is considered essential to the campaign against the disease and must be universal. Certain defects in the present English plan are discussed and remedies suggested. It is suggested that cases be admitted to municipal institutions as tuberculosis suspects. This would give the patient the benefit of early treatment, would obviate any delay incident to confirming the diagnosis and would not label him immediately as tuberculous, the dread of which still persists in the public mind. In London, provision of observation beds has already been made.—*Notification of Tuberculosis, R. Dudfield, Brit. J. Tuberc., January, 1923, xvii, 20.*

**Distribution of Pulmonary Tuberculosis in Yorkshire, England.**—The West Riding of Yorkshire has a population of over three million people and an area of nearly

two million acres. The diversity of its physical features and its industries especially commend it for the study of phthisis. It is subdivided into arbitrary district units under the tuberculosis administration of the West Riding County Council, some of which are mainly agricultural, others manufacturing areas and others mainly mining regions. Deductions have been made only from death rates. Charts which have been prepared, showing the phthisis death rate curves from 1892 to 1918 in several districts, indicate once more that the mining, urban and rural areas have a lower rate than the others, with one or two important exceptions. The age groups selected were four, (1) under 15 years, (2) 15 to 25 years, (3) 25 to 45 years and (4) from 45 years upward. Interesting differences are shown in the mortality of these different groups: for instance, in Rotherham, in the mining country of South Yorkshire, the mortality in the youngest age group is unusually high compared with that of Huddersfield, a woollen goods manufacturing area in West Yorkshire, while the reverse is true in the group from 45 years upward. Similar differences were noted in other dispensary areas. There is no doubt that adult phthisis in the older age group is more prevalent in Western Yorkshire, particularly the Todmorden district. These observations show that, as Brownlee has stated, no one method is capable of universal success in attacking a disease manifesting itself in such different ways. The high juvenile mortality rate from pulmonary tuberculosis in the Rotherham dispensary area was found to be accompanied by a high mortality rate from other respiratory diseases, including influenza and pneumonia. In rounding up the cases with positive sputum, the West and North, the textile and agricultural areas, were found to predominate. *Factors in Incidence: 1: Geology:* This is evidently of minor importance, except that in low-lying coal districts natural drainage is at a disadvantage, and in dry weather the hollowed-out waste spaces favor accumulations of dust and dirt being blown into the atmosphere. *2: Altitude and Rainfall:* The altitude of the majority of the towns in Western Yorkshire is higher than in South Yorkshire; with this is associated a heavier rainfall and more wind. Both of these factors have a cleansing and purifying effect, reflected in a lower mortality rate from all respiratory diseases among children under 15 years of age. A few mining districts, for example, Emley and Darton, are included among the higher areas. *3: Housing:* Little can be concluded here, as the housing conditions are nowhere above reproach and are especially poor in the two areas of the West Riding which show both a high and low mortality rate from phthisis. *4: Occupation:* Coal miners are on the whole a healthy class of men and, as Collis points out, respiratory disease among them has much diminished with improved ventilation of mines. Adults in the West Riding mining areas show a comparatively low mortality rate from phthisis. In this, immunity, as a result of childhood infection, probably plays a part; also the lesser degree of overcrowding as compared with the factory areas. On the other hand, the textile industry seems to be attended by a generally high mortality. In the factory, workers commingle in a warm, moist, still and enervating atmosphere and the homes are little better, so that something like twenty out of twenty-four hours are spent under bad atmospheric conditions. Likewise, children who have been comparatively healthy are ushered into factory life and exposed to massive infection at the same time. Especially high death rates are found in the quarrying districts north of Leeds and Sheffield, the glass manufacturing districts of Castleford, the Sheffield steel-grinding district, and the Batley district where the shoddy and blanket storing trade is important. Among prophylactic measures advocated are open air schools, better factory hygiene and routine medical examination of workers.—*An Investigation into the Distribution of Pulmonary Tuberculosis and Other Respiratory Diseases in the West Riding of Yorkshire, J. B. McDougall, Tubercle, January, 1923, iv, 145.*

**Antituberculosis Organization in France.**—The National Committee of Defense against Tuberculosis and the departmental committees have aimed to bring about coöperation between and to multiply agencies for preventing tuberculosis in children, as well as to foster the technical education of physicians and visiting nurses. Postgraduate courses on tuberculosis have been given with the help of the Rockefeller Foundation, and the idea of having full time specialized physicians in the dispensaries is making headway. Schools and scholarships for visiting nurses have been established in seven principal cities and a complete program of theoretical and practical training, including hospital training, has been adopted. A mutual benefit sick fund and old age insurance are to be provided for visiting nurses and also facilities for rest or medical care at the Sanatorium of Bligny. There are 425 dispensaries, of which 300 have professional graduate visiting nurses. Standard cards for medical and social records have been adopted, and technical and finan-

cial reports are issued every six months. Finally, a uniform diagnostic nomenclature for medical use has been adopted and a scheme for recording physical signs. There are 52 sanatoria, with 4280 beds, and 14 consumptive hospitals with 2995 beds. There are also 64 preventoria with 4200 beds, and 4290 beds in isolation wards of general hospitals. In addition there are numerous marine sanatoria with 10,096 beds. Propaganda has so far been chiefly left to the Rockefeller Foundation, but the National Committee is now preparing a program of its own. To summarize, France is now provided with a methodical organization and a satisfactory equipment, the various parts of which are centralized and coördinated through the National Committee.—*The Activities of the French Antituberculosis Organization, L. Bernard and Poix, Tubercle, January, 1923, iv, 160.*

**Tuberculosis Mortality in France According to Climatic Regions.**—Making use of the mortality statistics for tuberculosis for the years 1906 to 1913, covering the whole of France, the mortality has been computed for its several climatic regions. In order to eliminate, as far as possible, factors which are independent of climate, the deaths for each 1000 of the population are given are the whole climatic division, for cities having more than 5000 inhabitants, and for the communes containing less than 5000 persons. The table gives the mean figure for 1906–1913 in the seven climatic divisions of France:

| | CLIMATIC REGION | | | | | | |
|---|---|---|---|---|---|---|---|
| | Auvergne | Gironde | Mediterranean | Vosges | Rhone | Paris | Brittany |
| Entire population..... | 1.3 | 1.2 | 1.5 | 1.4 | 1.4 | 1.7 | 2.1 |
| Cities of more than 5000.... | 1.8 | 2.0 | 2.0 | 1.7 | 1.9 | 2.4 | 3.0 |
| Communes of less than 5000 | 1.0 | 1.1 | 1.1 | 1.3 | 1.3 | 1.4 | 1.8 |

Auvergne, the Vosges and the Rhone have continental climates; the Gironde, the Mediterranean, Paris and Brittany have littoral climates. The most favored climatic region, Auvergne, has a continental climate, but next in order of excellence, not differing very appreciably from Auvergne or from one another, are the two marine climatic regions of the Gironde and the Mediterranean. The rural mortality, which, from the standpoint of treatment and of climatic influence, is the most important, is the same on France's south Atlantic and Mediterranean seaboards. Comparing the different members of each climatic group among themselves, it seems that the Vosges and the Rhone are appreciably less salubrious than Auvergne. This region, the most southerly of the continental ones, has a mean annual temperature of 51.8 F.; the Rhone and the Vosges, with mortality rates the same (except for large cities), have mean annual temperatures of 51.8° and 49.3°F. The rate and frequency of temperature changes, however, differ very considerably in the three regions; the amount of rainfall, the number of storms and the force and direction of the prevailing winds all furnish factors that influence the incidence and course of tuberculosis. Certain of the maritime climates differ far more in their effects than do any members of the continental group; the Girondin and Mediterranean climates, belonging to France's southern and southwestern littoral, are almost equal to the best climate (Auvergne) and the Parisian and Breton climates, of the north and west seaboards, are the worst. Here, no doubt, sunshine, humidity and the character of the rainfall play important parts. In Brittany it rains from 180 to 200 days in the year. The winters are mild and the mean annual temperature, 51.8°F., is exactly the same as the temperature of Auvergne, the best climatic region.—*La mortalité par la tuberculose dans les différentes régions climatériques de la France, G. Ichok, Rev. d. l. Tuberc., 1922, iii, 267.*

**Tuberculosis in Netherlands during and after War.**—In the last few years the tuberculosis mortality has decreased, as also occurred in other countries following the marked increase of 1916 to 1918. After the war a rapid decrease followed and in 1920 the figures of 1912 were again attained. The Netherlands suffered from the war more than any other neutral country. The increased tuberculosis varied in the individual provinces, being exceptionally marked in the provinces of north and south Holland, Groningen and Utrecht, and slight in Zeeland and Friesland. There are two large cities in south Holland, Rotterdam and the Hague; in North Holland are Amsterdam and Utrecht. The high mortality in the provinces of Drente and Gelderland, bordering on Germany, reminds one of similar conditions in the neighboring Osnabruck and Aurich of Germany, where tuberculosis also was more prevalent on the farms than

in the cities, because of poor hygienic conditions. In the Netherlands alcoves and beds, cut off from light and air, are still quite common in the cities. On account of the increase in tuberculosis during the war, the government has taken up the fight against poor hygiene, and since 1918 has prohibited the building of homes with alcoves and berths. As a whole, tuberculosis in the Netherlands is more frequent in the cities than on the farms; in 1920 the mortality in the large cities had fallen to the level of 1915. The main cause of the sudden tuberculosis increase was the lack of important food substances, especially fats. In 1918 foods were scarce, and in many cases an appreciable loss of weight occurred. The influenza epidemic of 1918 no doubt occasioned an increase of tuberculosis mortality. The increase varied according to age. The increase was greatest at ages 5 to 13, and above this the increase gradually diminished.—*Die Tuberkulose in den Niederlanden während des Krieges und nachher, Prinzing, Beitr. z. Klin. d. Tuberk., March, 1922, l, 505.*

**Indigent Migratory Consumptive of Southwest.**—A study of the number of indigent migratory consumptives and their care was made in Colorado Springs and Denver, Colorado, El Paso and San Antonio, Texas, Phoenix, Arizona, and Los Angeles, California. An "indigent" is one who does not finance himself completely during his cure. During the year of 1920 records were obtained upon 7,319 indigents, and this represents one to every 155 of the entire population of the six cities. More than 60 per cent of them had been in the cities less than two years and were, therefore, classified as "nonresidents." Nearly all of the 7,319 had come in search of health, a majority of them at the instigation of physicians. Ninety per cent had applied for help when they had been resident one year or less. One-tenth of all were under age fourteen and of these 10 per cent were under age four. The largest age groups were (1) 25 to 29 and (2) 40 to 49 years. Fifty-one per cent were born in America, 20 per cent in Mexico; the remainder in widely separated countries, Russian Jews predominating with 9 per cent. Seventy-two per cent were men; 28 per cent were women. Of the men 70 per cent came without their families and only 29 per cent of the women did so. Attached to these 7,319 were 10,317 members of families living with them and of this number 5,371, or 52 per cent, were children, As to sources of migration, the middle Atlantic and middle western states furnished a majority of the cases. Records were uncertain as to the stage of the disease, as not all patients disclosed their presence at once. About 3 per cent had other than pulmonary tuberculosis. Of the pulmonary cases nearly 20 per cent were far advanced. The annual death rate was about one death to eight cases. Fifty-four per cent of those who had lived two years in these cities were lost sight of, 13 per cent had died, 10 per cent had left the city and 23 per cent were still in the cities at the end of the year. The cost to the community is relatively large, and ran from $0.22 to $1.75 per capita per year, depending upon the size of the city and the number of indigents. The facilities for handling such persons are sadly inadequate in all the cities studied. A study was made in Cleveland, Ohio, as a nonmigratory control city. Reports of individual cities are given in great detail and some instructive illustrations are presented.—*A Report on the Indigent Migratory Consumptive in Certain Cities of the Southwest, Jessamine S. Whitney, U. S. Public Health Reports, March 23, 1923, xxxviii, 587.*

**Tuberculosis in Industry.**—The relationship between tuberculosis and industry is a very important problem and its solution is fraught with difficulties, such as determining the inflences on the disease of the occupation *alone,* of the home environment, mode of living, poverty, etc. In this sort of study attention must be paid to special trade processes, such as those "in which irritative types of inorganic dust constitute a hazard" or where trauma is a predisposing factor, and also to general conditions, sanitation, light, ventilation, etc. Wide differences exist in the frequency of reported tuberculosis in industry, because data are insufficient as regards the sex, color, age, exact occupation, length of service and numbers of workers, the reasons for and the methods of the examinations, and the personal equation of the examining physician. Tuberculosis along with other diseases may be detected by entrance examinations of workers, but this concerns only the new worker and the one least valuable to the industrial plant. The procedure of most worth in industry is periodic examinations of all workers. By such means disease, especially tuberculosis, may be found long before the development of symptoms occurs. Examinations do not require the service of specialists, and early diagnosis of tuberculosis is difficult in only two types of case, namely, (1) those in which history and symptoms suggest tuberculosis but in which the physical signs in the chest are indefinite and (2) those which have the signs of pulmonary tuberculosis but the sputum remains

negative for tubercle bacilli. Periodic examinations should be made as frequently as the hazard of the industry and the judgment of the physician in charge indicate; the reported intervals range from one month to three years. It is preferable for the industry to conduct its own examinations.—*Tuberculosis As It Affects the Industrial Worker, F. A. Craig, J. Industr. Hyg., 1922, iv, 170.*

**Influence of Industrialism on Age Incidence of Phthisis.**—Mortality figures, covering long experiences in Sweden, Ireland, Scotland, England, Wales, America and other countries, are presented, to show the shifting of the maximum death rate from phthisis from one age period to another under the influence of industrialization. In Sweden, for instance, it is shown that up to 1830 the maximum incidence of the disease occurred at ages fifty and over. Sweden did not commence to develop industrially until 1870 and the next available mortality statistics (1911) show that the maximum incidence among both sexes had moved to ages 20 to 29, thus closely resembling the records for England and Wales in 1851. The industrial progress of Sweden probably by 1911 closely resembled that of England and Wales in 1851. The same phenomenon is illustrated from a different viewpoint, by comparing similar figures for urban and rural communities, as well as for sex in the same and different communities. A study of occupational records shows that in England and Wales a marked rise in food consumption and in real wages took place in 1890 to 1902, and at the same time there was a marked fall in phthisis mortality. In the next ten years none of these factors showed as great a change, a fact that must be remembered in studying such records. The shifting of the phthisis incidence is considered in various occupations, grouped according to the degree of change noted. Special attention is given to the "phthisis-ridden" industries, such as tailoring, shoemaking and printing. The high incidence here seems to be due to the great opportunity of infection in a crowded community. A study of industries in which there is exposure to silica dust (tin mining, gold mining and dressing sandstone) shows that phthisis in these workers occurs at an unusually late period of life, is associated with a high mortality from other respiratory diseases, and usually with a high mortality from Bright's disease. Silica dust is the chief cause of pulmonary fibrosis which particularly favors the development of tuberculosis, but other dusts such as oxide of iron and alumina may possibly have a similar action, even though far less pronounced.

*Summary:* The object aimed at has been merely to portray the course of events so far as the move of maximum incidence of phthisis mortality in any community is concerned. First, there are primitive communities with no death rate from the disease; such communities when infected, quickly succumb, and probably more or less equally at all ages. What happens in such a community, during the time that the disease from being a new infection becomes endemic, has not been traced. In a European non-industrialized community in which the disease is endemic, the age of maximum incidence is found late in life. When the habits and customs of such a community are disturbed by industrialization, the age of maximum incidence moves to early adult life. As such a community settles down to the new conditions, the age of maximum incidence steadily recedes again to late life. This process may be retarded by such influences as indoor sedentary life, or the alcoholic habit, or may even be reversed by such social upheavals as occurred during the war; it is essentially associated with the industries and is found taking place most rapidly in those occupations which have been least disturbed in recent years. The process appears to occur irrespective of the total phthisis death rate in the population; it has been slow among agricultural laborers with a low mortality, and among inn-servants with a high mortality; it has proceeded quickly for tailors with a high mortality, and extended furthest among clergy with the lowest mortality of all. In other words, resistance to phthisis in early life seems to depend upon the extent to which the race has suited itself to its environment, while the degree of mortality experienced appears to depend rather on aggregation of population which probably means opportunities for infection.—*The Influence of Industrialism upon the Age Incidence of Phthisis, E. L. Collis, Tubercle, March, 1923, iv. 241.*

**Meeting of International Congress for Fresh Air Schools.**—This was held at Paris from June 24 to June 27, 1922. Belgium, Spain, Holland, Luxembourg, Poland and the Red Cross League sent delegates. Communications were made concerning existing schools, and discussions took place concerning many problems of extending and improving fresh air schools and other preventoria. Resolutions were passed condemning unfit dwellings and long school days. It was recommended that the time for intellectual instruction be reduced to four hours, and that two hours in the open air be devoted to exercises in practical

hygiene and to esthetic education; that a considerable portion of moneys appropriated for school buildings be used for the creation of fresh air schools; that a fresh air room be established in every city school; that a play ground be annexed to every school which should be reserved for physical culture exercises and to sun baths; that at the earliest possible time fresh air day schools for sickly children be established in open spaces in cities and that each region establish a fresh air boarding school for children needing more assistance than would be obtained through attendance at a day school; that establishments for children below the school age be arranged for providing an open air life; that courses be organized in the normal schools for instruction in hygiene and pedagogy adapted to fresh air schools; that every fresh air school be provided with moving picture apparatus or, in cases where this is not possible, that an ambulant cinema be shared by a number of schools; and that a National Committee for Fresh Air Schools be organized in every country for the founding of fresh air schools, and for the study of their medicopedagogical problems.—*Abstract of secretary's report of the Premier Congrès International des Écoles de Plein Air, Paris, June 24–27, 1922, Reported in Rev. d. l. Tuberc., October, 1922, iii, 506.*

**Tuberculous Infection.**—Hamburger records observations in his own family confirming the Flügge theory of droplet infection. Repeated tuberculin tests on five children ranging from 4 to 14 years old, showed them to be tuberculosis-free, until three suddenly developed a phlyctenular conjunctivitis, after which they responded to tuberculin injection. The oldest son developed definite tuberculosis. Investigation brought out that the servant girl had been coughing for three to four weeks and had tubercle bacilli in her sputum. The children had been in school, in railroad stations and frequently on the train for years, without developing sensitiveness to tuberculin. Expectoration on the floor by the servant girl leading to possible dust infection, could be absolutely excluded. Hamburger looks upon the incident as one of unquestionable droplet infection. It is interesting also in that it contributes to the understanding of *conjunctivitis eczematosa.—Beobactungen über Tuberkuloseansteckung und Tuberkuloseerkrankung, F. Hamburger, München. med. Wchnschr., January 12, 1923, 54.*

**Influenza and Tuberculosis.**—It has been claimed that, following the 1889–1893 influenza epidemics, there was a sharp rise in the mortality rate from tuberculosis; that many active cases of pulmonary tuberculosis grew decidedly worse and many latent cases became active after an attack of influenza; that in London the death rate from tuberculosis doubled itself during the epidemic, but that after the epidemic the rate from the disease usually showed a material drop from the normal. The same and precisely contrary claims have been made from studies of the 1918 and 1920 epidemics, claimants of the contrary view holding that, in actuality, persons with tuberculosis developed a milder influenza than the average. Granting that influenza may not be severe in the tuberculous or may not as a rule cause an exacerbation of the old disease, authors have claimed that pulmonary tuberculosis is frequently an aftermath of influenza in persons in whom there had previously been no clinical tuberculosis. Many workers have explained the reported relative immunity of the tuberculous to influenza on the basis of the relative isolation, good hygienic surroundings and abundant rest of the tuberculous. Many tuberculous persons, however, do get influenza and die from the disease or from tuberculosis whipped into greater activity. Tubercle bacilli have been found for the first time in tuberculous patients only after an attack of influenza. There are fallacies in comparing the influenza morbidity rate in sanatoria with the rate in the public at large, for the rate in sanatoria, as in different army camps and industrial groups, varied tremendously, even where conditions seemed comparable and well controlled. There can be no positive statements made as to the actual and final effect of influenza upon tuberculosis, although the tuberculous do appear to be somewhat immune to influenza. —*Influenza, an Epidemiological Study, W. T. Vaughan, Monographic Series, Am. J. Hyg., July, 1921, 212.*

**Tuberculosis and Pregnancy.**—Artificial abortion and sterilization of the woman constitute a most valuable procedure, from the prognostic viewpoint, in cases of pregnancy associated with tuberculosis in any stage. In cases of manifest tuberculosis in all stages artificial abortion should be produced up to the seventh month of pregnancy. In the last three months of pregnancy and in the second or third stage of tuberculosis abortion should not be done, solely in the child's interest.—*Tuberkulose und Schwangerschaft, G. Winter und W. Opperman, Deutsch. med. Wchnschr., January, 1923, xlix, 115.*

**Endemic Influenza and Tuberculosis.**—In order to judge whether or not an intercurrent influenza has serious consequences on

pulmonary tuberculosis, statistics relating to seven epidemic outbreaks of influenza in Paris, between 1900 and 1920, have been arranged, with a view to showing the relation between influenza and the mortality from pulmonary tuberculosis. The weekly mortality figures for the three months before the epidemic and the weekly mortality figures during the epidemic are given in the table:

| YEAR | DURATION OF THE EPIDEMIC | WEEKLY MORTALITY FOR THE THREE MONTHS BEFORE the EPIDEMIC | | WEEKLY MORTALITY DURING THE EPIDEMIC | |
|---|---|---|---|---|---|
| | | Pulmonary tuberculosis | Influenza | Pulmonary tuberculosis | Influenza |
| | *weeks* | | | | |
| 1900 | 12 | 203.5 | 4.4 | 215.7 | 41.3 |
| 1901 | 7 | 203.0 | 6.1 | 241.4 | 21.1 |
| 1905 | 9 | 188.5 | 4.3 | 217.1 | 25.9 |
| 1907 | 9 | 211.8 | 5.7 | 257.5 | 51.2 |
| 1911 | 10 | 172.8 | 2.4 | 203.6 | 17.0 |
| 1918–19 | 31 | 126.2 | 10.4 | 167.5 | 266.1 |
| 1920 | 13 | 112.2 | 5.5 | 147.6 | 49.3 |

The figures show that during each epidemic the mortality from pulmonary tuberculosis is appreciably greater than during the three preceding months. The mortality change appears not to be influenced by the length of the epidemic.—*L'endémie grippale et la tuberculose, G. Ichok, Prog. Méd., September 30, 1922, 453.*

**Inheritance of Tuberculosis.**—Inheritance of tuberculosis through the germ cell, such as occurs in syphilis, has never been shown. Foetal tuberculosis has not been found prior to the establishment of the embryonic circulation. But transplacental infection, though rare, undoubtedly occurs. Its infrequency is explainable by the great rarity of tuberculous lesions of the placenta. Moreover, its transmission through other placental lesions, which allow the passage of bacteria, would necessitate the presence of tubercle bacilli in the blood in considerable numbers, a not very frequent condition. Transplacental inheritance is rare in animals as well as in man, and laboratory experimentation has shown that the young of tuberculized animals are rarely born tuberculous. Nevertheless, tuberculosis is far more frequent in the descendants of tuberculous parents than in other persons, mostly, to be sure, as a result of family infection after birth. But, excluding the latter, it is undoubted that a greater number of ill-nourished children are born of tuberculous than of normal parents, and that, family contagion apart, the inheritance endowment of such ill-nourished children renders them less resistant to tuberculous infection than are better endowed children. This lessened resistance may arise from an inherited predisposition or it may be a congenital dystrophy. That the latter occurs frequently has long been observed. Abortions are frequent; and in advanced tuberculosis of the mother 48 per cent of the children are born prematurely and underweight. Tuberculosis, like other diseases, interferes with intrauterine development, and in the children of tuberculous mothers defects and malformations are unusually frequent. Besides a congenital dystrophy due to tuberculosis as a wasting, intoxicating disease, is there also a specific tuberculous dystrophy creating an hereditary predisposition? Such a predisposition cannot be confidently denied, but it has also not been proved to exist. A special tuberculous *habitus* has long been noted: the children of tuberculous families are thin, slender, and delicately built with winged shoulder blades and narrow chests. But it seems probable that this special build indicates not simply a predisposition to tuberculosis but its existence; that the form has assumed these features because the germs, already present in the body, have reacted upon growth to create the condition described as "pretuberculosis."—*Tuberculose infantile et hérédité, P. Lereboullet, Prog. Méd., February 3, 1923, no. 5, 49.*

**Death Age of Parents of Tuberculous and Cancerous.**—The constitutional soundness of an individual may be fairly measured by the duration of his life, and in this sense constitutional superiority or inferiority is inherited. Do the tuberculous or the cancerous come from a superior or an inferior constitutional stock? This means are the lives of the parents of the tuberculous and the cancerous shorter or longer than the general run of the parents of the nontuberculous or noncancerous—parents of the same number and age distribution. Accurate histories of 985 pairs of parents of tuberculous persons and 131 pairs of parents of cancerous persons, together with accurate records of an equal number of pairs of parents of nontuberculous and noncancerous persons, were used in this study. It has been found that the fathers of tuberculous individuals die at an average age of two to three years *less* than the average death age of fathers of nontu-

berculous persons; that the death age of mothers of tuberculous individuals is nearly six years less than that of mothers of non-tuberculous individuals in the same age groups. Likewise, and contrary to the claim that cancer is a disease of the strong constitution, the dead fathers of the cancerous have a mean death age of three and a half years *lower* than that of fathers of the non-cancerous. There is but slight difference in the death age of mothers of the cancerous and noncancerous. The parents of the cancerous have a higher mean age than the parents of the tuberculous, because "duration of life is inherited, and cancer is a disease of advanced age while tuberculosis is a disease of early life."—*The Age of Death of the Parents of the Tuberculous and the Cancerous, R. Pearl, Am. J. Hyg., January, 1923, iii, 71.*

**Atavistic Degeneration and Tuberculosis.**—Predisposition to tubercle is investigated from the standpoint of individual characters. Those characters which are more common in the tuberculous than in the nontuberculous and not in themselves caused by the disease are considered. In brief, these are as follows: *Nervous system:* The special liability of the insane to tubercle is a truism. In England and Wales in 1901 the tuberculosis mortality rate was under 0.2 per cent. The rate for borough and country asylums was 15.8 per cent, and the evidence is against tuberculosis being acquired in the asylum. *Circulation:* Tuberculosis is common among congenital cardiac patients, especially those with pulmonary stenosis plus defect of the ventricular septum. Also it is an old observation that the heart and arteries of consumptives are exceptionally small. This is not wholly due to wasting from malnutrition and underfunctioning but starts from an autochthonous constitutional anomaly. Orthodiagraphic radiological examination, applicable in early disease, before wasting and debility have had time to take effect upon the circulatory apparatus, speaks clearly for a constitutional peculiarity. Small heart is especially frequent in tall, narrow-chested subjects, as it is but a part of the asthenic type of constitution. *Skin and Appendages:* Hypertrichosis of the back is a common characteristic of tuberculous children. Pulmonary tubercle favors brunettes, but in bone or glandular disease fair traits predominate. Red hair, "partial erythrism," that is, dark head hair and red pubic hair, and *Haardisharmonie* (dark brown hair with red moustache) favor tubercle. Ichthyosis is seven times more frequent in consumptives than in comparable controls, and unbiased study goes to show that it precedes the tubercle. *Defects, Abnormalities, Malformations:* Both obstructive and atrophic abnormalities of the nasopharynx are much commoner in consumptives. The asthenic type of constitution characterized by thin bones, flat narrow thorax, broad intercostal spaces and puny musculature is well known. Among other abnormalities mentioned as being more frequent among the tuberculous than the nontuberculous are polymastia, absence of beard in males, floating tenth rib, pubic hair area of shape appropriate to the opposite sex, long reach in proportion to height, etc. Will any one ascribe all of these stigmata to tuberculo-toxemia? Yet it was stated in Brussels in 1922 that the so called stigmata of tuberculous predisposition are nothing but the signs of an already present infection. Much evidence is adduced to show that these curious characteristics are really atavistic or degenerative traits accompanying atavistic reversion to a primitive susceptibility to tuberculosis. Thus the consumptive of civilized races, compared with the rest of his community, is "less often in the mean, more often in the extreme."—*The Atavistic-Degenerative Diathesis of Tuberculosis, W. C. Rivers, Lancet, January 20, 1923, cciv, 120.*

**Trauma and Joint Tuberculosis.**—In a case, seen June 11, there is a history, not well substantiated, of an accident on February 28. Work was not interrupted till April 14. The physician of the insurance company saw at that time a hydrarthrosis which no longer exists; improvement in other respects is marked. The probability is in favor of a lesion due to congenital syphilis or to tuberculosis. Admitting, with reservations, that it is tuberculosis, this was revealed but not aggravated by the accident, if there was one. The evolution during four months, with a hydrarthrosis at the end of six weeks which has since been absorbed, is the ordinary evolution of benign tuberculous arthritis of the knee in its synovial form. On March 17, the second subject fell while unloading a truck; there was pain, rapid swelling and hemarthrosis. On April 22 resection was done; synovial papillae of tuberculous nature were found, and a superficial erosion of the femoral condyles. Recovery was good. This case is probably one of those in which a latent tuberculous synovitis serves as substratum to certain hematoses which are at first purely traumatic. The synovitis surely preexisted, since the lesions observed at the end of a month were certainly more than a month old. But aggravation by trauma, if not certain, is at least impossible to deny;

hence the accident should be judged responsible. However, a subsequent recurrence of trouble must be imputed, not to the accident, but to the natural evolution to which such synovial tuberculosis is liable. In the third case a slight contusion which did not prevent the subject from working for five days was followed eventually by tuberculosis of the knee. But the knee had been cared for by massage and mobilization, and improvement was rapid as soon as immobilization with compression was begun. The diagnosis, therefore, was tuberculosis revealed by the accident and aggravated, not by it, but by improper treatment.—*Accident du travail et arthrite tuberculeuse du genou, A. Broca, Prog. Méd., September 23, 1922, 448.*

**Inflammatory Type of Pulmonary Tuberculosis in Infants.**—The tuberculous lesions that are usually seen at the autopsies of babies show a form of infection that has taken place in two stages, more or less distant in time. Histological examination of the chancre of inoculation does not show whether the initial lesion was a classical nodule or whether the bacilli brought about a localized pneumonia at the point where they entered. To solve this question it is necessary to study the lungs of patients who succumbed to an infection so massive that death occurred within a very short period, and thus to observe how the formation of lesions and the distribution of bacilli occurred. Such cases are very rare and can be met with only in very young infants recently inoculated and eminently susceptible to infection. There are reported two cases of infants, three and five months old, one who died after an illness of fifteen days, the other after eighteen or twenty days. Autopsy showed in each case a tuberculosis localized in the lungs. There were no other anatomic changes than inflammation of the alveoli with early signs of degeneration, and an incredible abundance of bacteria. They differed from ordinary bronchopulmonary lesions by the absence of polynuclears and of an appreciable fibrinous exudate, and also by lack of signs of congestive or protective reactions of the alveolar walls. The fact that these lungs had been invaded in so short a time and in their whole extent by such a mass of bacilli, seems to indicate a special predisposition to the disease, the more especially as neither child was directly infected by the mother. These observations point to the tuberculous nature of certain bronchopneumonias of early infancy which resemble ordinary or septic pneumonias.—*Deux cas d'alvéolite bacillaire initiale rapidement mortels chez des nourrissons de trois et de cinq mois. Pneumonie bacillaire suraiguë des jeunes enfants, H. Barbier, D. Debée and Covanet, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, March 11, 1922, reported in Rev. d. l. Tuberc., 1922, iii, 284.*

**Skin Hypersensitiveness during Fatal Tuberculosis of Infancy.**—The skin reaction was followed in twenty infants with fatal tuberculosis. Two never gave a positive reaction to tuberculin. Of the 18 others, 7, or 35 per cent, reacted in the manner typical for adults, that is, the reaction grew progressively weaker until some time before death it became negative. In 11, or 65 per cent, the reaction remained positive throughout the illness, that is to say, it persisted until death or until the last few days of the agonal period. In most of these 11 cases the reaction did not grow weaker during the illness. The persistence of a cutaneous reaction has, therefore, no prognostic value in tuberculosis of nurslings. The anatomoclinical form does not determine the difference of reaction. All forms, miliary tuberculosis, bronchopneumonia and caseous pneumonia, occurred in both categories. From the standpoint of their general health there were babies in whom the presence of subcutaneous fat, increase of weight, firmness of flesh, resistance to skin infections, satisfactory digestion, etc., gave evidence of previous good health; and those in whom all the ordinary manifestations of malnutrition were present. The temperature curve during illness was also different in these two categories; in the well-nourished babies the temperature remained elevated till death, except in one case in which it was subnormal at the end. All the ill-nourished children had temperatures below normal near the end and in some it was markedly subnormal for several days before death. All the children in whom the skin reaction remained positive were well-nourished and, conversely, the children in whom the reaction became negative before death, and the two cases in which a positive reaction was absent during the whole period of illness, were all ill-nourished. Of the 7 in whom the reaction became negative some weeks before death, 5 received artificial feeding, one mixed feeding, and only one was breast fed. Of the eleven in whom the reaction remained positive to the end, one was fed exclusively on condensed milk; the others were fed partly or altogether from the breast. The persistent skin reaction ran parallel with a well-nourished state, but was no indication that the tuberculosis would not run a fatal course. —*La cuti-reaction au cours de la tuberculose évolutive mortelle du nourrisson, R. Debré and J. Laplane, Rev. d. l. Tuberc., August, 1922, iii, 349.*

**Tuberculin Reaction in Infancy.**—The findings are based on a study of 3,889 infants, 3,000 tuberculin reactions having been made with human or bovine tuberculin, with Pirquet and Mantoux methods, the Belfanti, Pasteur and Behring antigens, with the urine and with the cerebrospinal liquid. Of 629 cutaneous tests, 26.39 per cent were positive; and of 885 intracutaneous tests, 34 per cent. The latter is more sensitive, harmless and exact. The allergic reaction in infants is the index of humoral and cellular immunity, the expression of active or latent tuberculosis, irrespective of the human or bovine nature of the infection. The cutaneous allergic reaction can be present and persist independently of general immunity. The urine reaction is definitely specific in nature, but not indicative of the activity of the tuberculosis, the auto-urine reaction being no exception. The spinal fluid reaction has so far given uncertain and contradictory results, and is useless in differential diagnosis. The "regional reaction" (Pisani) has not succeeded, at least in infants, in revealing the location of the tuberculous process.—*L'état actuel de la tuberculino-réaction dans l enfance, E. Mensi, Arch. de Méd. d. Enf., February, 1923, xxvi, 65.*

**Tuberculin Tests in Infancy and Early Childhood.**—This is a statistical study of tuberculin tests on infants and children up to 4 years of age. Eighty-one per cent of the cases were from 6 weeks to 2 years of age, and 19 per cent were from 2 to 4 years. One group of cases gave a positive history of contact with tuberculous subjects, either in the family or outside of the immediate family. Another group showed some clinical entity requiring confirmation of or differentiation from a tuberculous infection. The third group was of those given routine tests before placement in boarding homes. The females gave a positive percentage of 61, the males 54. There was an increase in the percentage of positive reactions corresponding with the increase in age, being 35 per cent in infants under 6 months of age and 87 per cent in children from 3 to 4 years of age. The colored race gave the highest percentage of positive reactions. Patients exposed to two or more sources of infection gave a higher percentage positive reactions than those exposed to only one. When there was but one source of contact, that one was most commonly the mother. Children giving a negative history of exposure gave only 15 per cent positive reactions as against 44 per cent for those giving a positive history. Scrofula gave the highest percentage of positive reactions, miliary tuberculosis the lowest. By using the intracutaneous test, a higher percentage of positive reactions can be obtained. A satisfactory standard dilution for routine intracutaneous testing is 1 to 1,000, using 0.1 cc.—*A Statistical Study of the Tuberculin Tests in Infancy and Early Childhood, S. A. Wahl and H. J. Gerstenberger, Arch. Pediat., March, 1923, xl, 143.*

**Prophylaxis of Tuberculosis in Infants.**—In a rural centre for infants at Mainville-Draveil, 24 kilometres from Paris, 95 patients were cared for during the years 1920 and 1921. Thirty-seven of these babies were born of tuberculous parents. The centre aims to remove infants as yet free from tuberculosis from all contact with tuberculous members of the family as soon as possible. A cutaneous tuberculin test is done on each infant before admission to the centre, and none is admitted with a positive test. The infants are then placed in strictly supervised private homes within a radius of 2 kilometres from the centre. The nurses are paid 150 francs per month. Of the 37 infants known to have been exposed to tuberculosis, 7 died (2 of bronchopneumonia, 1 of digestive disturbance in a premature heredosyphilitic, 4 of tuberculosis, "meningitis," etc.). The authors consider that in view of the almost fatal prognosis of tuberculosis in infancy, and of the almost inevitable contamination of a child in contact with tuberculous parents, the centre's mortality of 19 per cent for such children is decidedly encouraging.—*Le centre d'élévage et de prophylaxie anti-tuberculeuse pour nourrissons de Mainville-Draveil, R. Dubost, G. Blechmann and François, Nourrisson, November, 1922, x,* 386.

**Prognosis of Tuberculosis in Infancy.**—Although it is almost universally accepted that tuberculosis in infancy means an early death from the disease, many observations indicate that as a generalization this is untrue and that the prognosis is frequently not bad. A number of cases are cited in which infection developed in the early months of the first year, as early as the second month in one case, and was followed by complete clinical recovery under several years' observation. The prognosis apparently depended upon the condition of the mother at the time of pregnancy. If she was already tuberculous the child withstood infection better than an infant which acquired tuberculosis from parents who contracted it after the birth of the child. Langer believes that Römer's well known experiments on sheep do not well represent the conditions in man, the experimental infection being a grosser insult than the

natural infection, and tending to wipe out a slight but undeniably existing immunity. He thus believes that some immunity is transmitted; whether it is an active one is aside from the main point. This immunity must be an important epidemiologic factor.—*Die Prognose der Säuglings-Tuberkulose, H. Langer, München. med. Wchnschr., January 19, 1923, 76.*

**Initial Form of Acute Tuberculosis of Childhood.**—It is particularly easy during the months of spring to observe cases of rapidly fatal tuberculosis in children, which have developed without a noticeable preliminary attack. In these autopsy frequently shows a chancre of inoculation, recent and very small, caseous and ulcerated, but with scarcely any extension to the lymph nodes of the hilum, of which only two or three may be swollen and beginning to caseate. The other lesions are those of miliary tuberculosis or meningitis. In these cases death has occurred too rapidly to allow the usual lymphatic involvement; generalization has occurred simultaneously with the development of the initial lesion; a primary tuberculosis has proceeded to an acute infection in which a particularly dangerous localization (the meninges) may be the cause of death. Hence the important distinction may be made between death from acute tuberculosis (tuberculous bacillemia) and death from meningitis. A case recently observed has furnished material which bears upon the question of whether every miliary tuberculosis is fatal. In a child who died of acute pneumonia there were found, besides the recent, active lesions, granulations of an earlier date, undergoing fibrosis, and with no bacilli in their neighborhood. Such cases may easily pass unrecognized, and are often diagnosed as troubles of teething or digestion, or as bronchopneumonia. Tuberculosis ought to be suspected when the child's development and general health are not satisfactory, especially in tuberculous families with a high infant mortality from meningitis or pulmonary congestion.—*Les formes aiguës initiales de tuberculose chez les enfants, H. Barbier, Section d'études scientifiques de l'oeuvre de la tuberculose, May 13, 1922, Reported in Rev. d. l. Tuberc., August, 1922, iii, 387.*

**Diagnosis of Hilum Tuberculosis in Children.**—Not all cervical lymph node enlargements are of tuberculous nature. A great many are the result of mouth and throat infections. The most important symptom of hilum tuberculosis is an expiratory dyspnea, which is caused by the mechanical pressure of the tracheobronchial lymph nodes on the trachea. It may lead to cyanosis. A prolonged dyspepsia in early infancy is often the result of hilum tuberculosis. D'Espine's sign is very valuable in diagnosis. The tuberculin test should always be employed whenever a suspicion of tuberculosis exists. The most reliable method is the intracutaneous, in which 0.1 cc. of 1 to 1000 dilution of O. T. is injected in the skin of the forearm. The X-ray is invaluable, but it has a disadvantage in that the nodes in the first stage of the disease, when the tuberculous process is at the height of its activity, do not cast a shadow. It is only later, when they become caseous or calcified, that they are seen.—*Die Diagnose der kindlichen Bronchialdrüsentuberkulose in der Praxis, H. Langer, Deutsch. med. Wchnschr., October, 1922, xlviii, 1343.*

**Leucocytes in Tuberculosis of Childhood.**—In pulmonary tuberculosis in childhood the same relation in the differential and total white blood counts exists as in tuberculous adults. Lymphocytosis and eosinophilia should be regarded as favorable prognostic signs. In hilum tuberculosis the lymphocytosis is an undoubtedly good prognostic sign. A differential diagnosis between an active and a quiescent hilum tuberculosis cannot be made by the white count. The importance of the white count in tuberculous children lies in guiding specific therapy. This is especially important in bronchial and hilum tuberculosis, in which overdosage of tuberculin will cause clinical symptoms very often only after irreparable damage has been done to the patient.—*Über das weisse Blutbild bei der Bronchialdrüsen- und Lungentuberculose im Kindesalter, C. J. Raffauf and Grimm, Zeitschr. f. Tuberk., November, 1922, xxxvii, 107.*

**Artificial Pneumothorax in Childhood.**—The operation was done without accident and with satisfying results on 23 children; in all but 2 it was followed by a gain in weight. Pneumothorax is indicated in about 10 per cent of the cases of pulmonary tuberculosis of childhood. Owing to adhesions or to noncompressibility of the lung injections of gas into the pleura can be continued in only about 7 per cent. According to Rist pneumothorax is too seldom made in children. In ulcerative tuberculosis, of which the prognosis is so grave, he considers that good results may often be got in unilateral forms if the diagnosis is made early. The operation presents no difficulties inherent in the patient's age, and it may even be practised in early infancy. It is particularly indicated in dilatation of the bronchi and gives brilliant results in those cases.

Ordinarily the operation produces no deformity of the thorax.—*Contribution à l'étude du pneumothorax therapeutique chez l'enfant tuberculeux, Armand-Delille, Isaac-Georges and Ducrohet, Meeting of Société Médicale des Hôpitaux, February 16, 1923. Reported in Presse Méd., February 21, 1923, no. 15, 169.*

**Tuberculous Cervical Adenitis in Children.**—This disease differs in many essential particulars from that in adults. A varying proportion of cases has been proved to be of bovine origin, and in all probability a large proportion is milk-borne. An illuminating illustration occurred in a very high-grade dairy, the milk from which was certified. A small epidemic of tuberculous cervical adenitis followed a change of ownership with the addition of some new cows to the herd, and tuberculin tests made later showed about a dozen cows reacting, one having a tuberculous udder. Every week cows are shipped into the Brighton market from all over New England, which are insured against a positive tuberculin reaction by "plugging" with a dose a fortnight before the official test. The disease, in the beginning, is a local infection, entering through the lymphoid tissue of the tonsils, adenoids or bowel, and the involvement of the cervical or mesenteric lymphatics is a secondary manifestation. The tonsillar lymph nodes lie directly below and behind the angle of the jaw, adjacent to the great vessels, while the nodes behind the sternomastoid muscles drain the adenoids. There is little evidence that carious teeth lead directly to cervical infection, but they form a nidus from which the tonsils may become infected. The primary focus may be small, often of pinhead size. In adults, tuberculous cervical adenitis is seldom milk-borne and may be a secondary manifestation of tuberculosis elsewhere. Such cases are also seen in children, but the ordinary type is at first a disease purely local and curable by complete eradication. The method of excision advocated has been adopted in 402 cases in the ten years, 1912 to 1921. Excision is clearly indicated in cases of discrete tuberculous adenitis and definitely encapsulated caseous nodes, but not in nonencapsulated abscess or where the distribution is so extensive as to indicate systemic disease. Besides the 402 cases treated by excision, there were 200 cases treated by other operative measures. The total mortality rate was 1.3 per cent in all and about 0.3 per cent in the cases where complete eradication could be expected. Tuberculin has been used but little. X-ray has been used after operation on chronic ulcers and sinuses, with many excellent results. There may be danger in its use where there is no sinus to act as a vent for broken-down tuberculous tissue. *Dangers of operation:* 1. Damage to important anatomic structures, particularly nerves, and especially the spinal accessory, which lies in a rather loose layer of connective tissue covering the deepest lymph nodes; its posterior position is more superficial and behind the sternomastoid muscle the danger of injury is great. The lower fibres of the facial nerve are liable to injury where they pass across the angle of the jaw and the damage done is immediate and irreparable. The pneumogastric and phrenic nerves must also be kept in mind. 2. The risk of setting up an acute miliary tuberculosis or tuberculous meningitis, a risk always incident to surgical tuberculosis. Trauma should be avoided, although much depends also on the severity and activity of the infection. *Conclusions:* 1. We should recognize and eradicate most cases of tuberculosis of cervical lymph nodes in children while the disease is still localized in tonsils, adenoids or lymph nodes. 2. Excision should not be attempted in the presence of acute inflammation or spreading abscesses. 3. The results of excision through a skin-fold incision are excellent. 4. Injury to the spinal accessory nerve is a rare accident but inevitable if a block dissection is done. 5. Injury to the lower branches of the facial nerve is to be guarded against but sometimes cannot be avoided. 6. The danger of acute miliary or meningeal tuberculosis always exists with or without treatment. 7. The nature and probable course of the pathological process should determine the method of treatment. 8. Prevention by good hygiene is most important. There is still much room for improvement in our milk supply.—*Tuberculous Cervical Adenitis in Children, J. S. Stone, Bost. M. & S. J., March 1, 1923, clxxxviii, 272.*

**Liver in Chronic Tuberculosis of Childhood.**—Autopsies of tuberculous children show that in at least 50 per cent the liver is affected. There are a number of types of disease: miliary granulations; superficial isolated tubercles which may be large or small; large tubercles and caseous masses in a latent state within the liver; or tubercles opening into bile passages, that is, biliary tubercles. Besides these granulations and isolated tubercles there may be degeneration of the liver, either fatty or amyloid. The symptomatology produced by tuberculosis of the liver may be extremely complex. A fatty liver is an enlarged liver, not hard, sometimes slightly painful, giving different signs of hepatic insufficiency:

urobilinuria, alimentary glycosuria, disturbance of urea formation, and different modifications of liver metabolism. The condition of the liver gives information of value in the diagnosis of tuberculosis. An enlarged liver may suggest tuberculosis, particularly in children who develop poorly and present various troubles of nutrition.—*Le foie dans les infections chroniques de l'enfance et surtout dans la syphilis et la tuberculose, Lereboullet, Prog. Méd., December 2, 1922, 564.*

**Relation of Preventorium to Tuberculosis of Children.**—Heretofore, most work among tuberculous children has been done among those in whom the disease is already established. But, if we wish to diminish the number of patients that fill our sanatoria each year, we must concentrate our efforts on treating those children who, though not yet actively diseased, have a tuberculous infection and are destined to be the consumptives of the future. Two things are necessary in doing this; we must pay more attention to the early diagnosis of tuberculosis in children and we must protect those children who are infected from developing the disease. In France the Grancher Society is founded upon the theory that the most effective method of controlling the disease is to prevent its contagion by placing the children of tuberculous parents, before they become infected, into healthy families throughout the provinces of France. In this country open air and day camps are excellent for building up the undernourished children that come from healthy homes; but it is impossible to safeguard those that come from families in which tuberculosis exists, unless we eliminate the constant peril of infection by removing the child from the home for a sufficient time to build up its resistance. There are but few such institutions in this country, such as Farmingdale, New Jersey, and Prendergast Preventorium, at Mattapan, under the auspices of the Boston Tuberculosis Association. In the latter only those are admitted who show evidence of a tuberculous infection, or in whose family tuberculosis exists, and who as a result of their environment have little change of escaping the disease. No one yet knows how long it takes for a child showing evidence of a tuberculous infection to acquire sufficient immunity to resist reinfection. A child may in a short time appear physically fit and return to normal weight, but until the child has remained in this healthy environment for at least a year, or until the danger from infection has been removed at home, we should not feel that the child had been given his chance. Each child should be closely followed and have repeated physical examinations, Pirquet tests and X-ray examinations made for a number of years. In this way only may a large group of cases be followed into adult life, and the true value of the work of the preventorium proved.—*The Preventorium and Its Relation to Tuberculosis in Children, R. Clifford, Boston M. & S. J., January 18, 1923, clxxxviii, 66.*

**Infection of Family from Tuberculous Cow.**—This is a report of infection derived from a cow known to be tuberculous and used contrary to competent advice. The father of the family did not believe, in 1912, that cows could have tuberculosis. Although the cow was tested for tuberculosis and called suspicious and the man was specifically warned of the danger, he sincerely disbelieved it, and collected the milk for household use until the animal looked very sick and was killed, the postmortem showing generalized tuberculosis. The next year the son developed tuberculosis, later spending four years in a hospital where bone grafts were used in treating the diseased spine; now at the age of seventeen he weighs 51 pounds. The wife died of tuberculosis after an illness of seven years and two daughters are now ill with the disease. The wife's family history was negative.—*Tuberculosis Contracted by a Family from a Tuberculous Cow, E. D. King., Jr., J. Am. Vet. Med. Ass., March, 1923, lxii, n. s. xv, 763.*

**Bovine Tuberculosis.**—Although the human tubercle bacillus is responsible for a great preponderance of pulmonary tuberculosis, the bovine bacillus produces considerable extrapulmonary disease and death, and efforts should be made to diminish the danger from this agent. The portal of entry probably determines much of the difference in the location of the disease set up by the two types of bacilli. If we swallowed the human type habitually with our milk, we should develop a preponderance of abdominal and cervical node infection from the human type; and, if we were accustomed to inhale the bovine type, much of our pulmonary tuberculosis would be of bovine origin. Ingestion of bovine bacilli in milk probably leads to considerable immunity to later infection by human bacilli, as the disease from the human bacillus tends to be severe in localities where the herbs are relatively free from infection. But every effort should be made to eliminate the bacilli from milk, regardless of any immunizing effect they may possess, for they also set up serious disease. Better herd control and greater mixing of milk help, and

pasteurization kills the bacilli. Danger from rickets, etc., lurks in the practice of boiling of milk. Studies upon drying of milk should be encouraged.—*Bovine Tuberculosis, S. L. Cummins, Public Health, June, 1922, xxxv, 251.*

**Tuberculosis and Its Relation to Feeding and Marketing of Live Stock.**—It is the insidiousness of tuberculosis that is chiefly responsible for its great prevalence in live stock throughout this and other countries today. Of all the hogs slaughtered under government supervision during the year 1921 the average loss was nearly 10 cents on the hundred pounds live weight. The National Live Stock Exchange at the last annual convention passed resolutions, urging all hog buyers to pay a bonus of 10 cents per hundred on hogs bred and raised in tuberculosis-free localities. These resolutions were accepted by the "Big Five" and other smaller concerns situated throughout the Middle West. There are a large number of counties in the United States that are successfully eradicating tuberculosis from their herds. Greater success comes to such an activity when the people in the different communities contribute a certain amount to the general sum. Tuberculosis in steers and heifers is not so great a factor in increasing the cost of production as in hogs, because the percentage of tuberculosis among the young feeding cattle is small, but it is an important factor in feeding cattle for beef and milk production. The removal of reactors from herds will not only prevent the spread of the disease in the herd but it will prevent the loss of feed that is being wasted on cattle incapacitated with tuberculosis. While the five years of work, which has really been an organization period, has not as yet reduced the condemnations of hogs in the nation as a whole, it has reduced the number of cattle retained for tuberculosis from 2.6 per cent in 1916 to 1.9 per cent in 1922.—*Tuberculosis and Its Relation to the Feeding and Marketing of Live Stock, H. R. Smith, J. Am. Vet. Med. Ass., January, 1923, xv, 486.*

**Bovine Tuberculosis in France.**—The fact that in many countries where bovine tuberculosis is nonexistent or extraordinarily rare, but where human tuberculosis is very prevalent, and children are never fed with cow's milk, as in Japan, Indo-China, India and Turkey, is an evident proof of the quite preëminent importance of interhuman contagion. The fight against bovine tuberculosis offers but a limited interest from the point of view of the protection of public health; the bovine type of bacillus occurs in from 4 to 10 per cent of the various types of tuberculosis of childhood, but quite exceptionally (at the most 3 per 1000) in cases of chronic tuberculosis in adults. In France the number of tuberculous cattle was estimated at 10 per cent in 1903 and 16.5 per cent in 1910; since then the situation has become more serious. In provinces where cattle are kept permanently in stables the proportion of those which react to tuberculin exceeds 40 per cent. On December 20, 1921, there were 18,268 infected farms in France, containing 144,065 tuberculous cattle, being an average of 8 animals per homestead. The mountainous regions with less cultivation are proportionately more affected than those of large or average cultivation, the reason being that the hygiene of the stables is particularly defective there. The total bovine population of France in 1920 numbered 12,757,720, so that the number of tuberculous cattle is not less than 2,000,000. Great Britain is apparently no better situated, according to the figures of Sheridan Delépine. A comparison of statistics of tuberculin tests among cattle and human beings, as shown in the following table, is of interest. (Two tables are combined by the abstractor.)

*Tuberculin Reaction*

| AGE | POSITIVE REACTIONS AMONG 100 ANIMALS IN EACH AGE GROUP (DELÉPINE) | POSITIVE REACTIONS IN THE HUMAN SPECIES |
|---|---|---|
| *years* | *per cent* | *per cent* |
| 0–1 | 3.4 | 5.5 |
| 1–2 | 13.2 | 20.0 |
| 2–3 | 24.1 | |
| 3–5 | 23.5 | |
| 2–5 | | 55.0 |
| 5–9 | 48.9 | |
| 5–15 | | 77.0 |
| Above 15 | | 89.0 |

The conditions of the contamination of cattle in the stable being comparable to those of family association in the human species, it is evident that, if the life of the cattle was of equal duration to that of man, nearly all of them living habitually in stables would react to tuberculin, like the inhabitants of our overcrowded towns in Europe. It is no less evident that this positive reaction to tuberculin has no different significance for cattle than for man. It does not necessarily indicate a serious lesion, liable to propagate the disease, but rather the existence of a bacillary seat of infection

which in the majority of cases remains occult or latent, indefinitely silent during the whole life, and in many cases heals when the subjects who have them are protected from occasions of reinfection for a sufficiently long time. The eradication of bovine tuberculosis is therefore a special economic problem and it must be attained by a better organization in the hygiene of the stables, by tracing the disease, and by the isolation or early slaughter of animals having contagious lesions. All milk cows bearing contagious lesions should be examined and slaughtered, but cows showing no apparent or clinically discoverable lesions, whose udders are sound, whose milk contains no tubercle bacilli, and whose general health is excellent, may be preserved for milk production, and they should not be prevented from being sold under the sole pretext that they reacted to tuberculin. In France, if all tuberculin-reacting cows were withdrawn from milk production, the milk supply would be reduced by a third, resulting in a further rise in the price without any appreciable advantage resulting to public health. This latter would be without doubt much more effectively protected by the obligation to sell, especially for the feeding of children, only pasteurized milk, except when such milk comes from cows frequently and regularly tested, submitted permanently to the supervision of veterinaries, and under the condition that it should be delivered in sealed bottles.—*Shall We Slaughter Milk Cows Which React to Tuberculin? A. Calmette, Meeting, Académie de Médecine, Paris, translated and reported in Brit. J. Tuberc., January, 1923, xvii, 15.*

**Tuberculosis of Subcutaneous Tissues and Epididymes in Bull.**—In July, 1922, the animal showed 15 or more firm, freely movable and painless nodules, some as large as a walnut, beneath the skin, from the ischial tuberosity to the hock. Nodules were visible in the neck of the scrotum and the epididymes were greatly thickened. The nodules were then of about two months' duration. Tuberculin tests gave negative results in November, 1921, and July 17, 1922. A section of one of the subcutaneous nodules showed tuberculosis. The animal lost weight, became very dyspneic and was killed August 11, 1922. Autopsy showed the nodules in the subcutaneous tissue and in the fascia between the muscles; they appeared isolated, clustered or in chains following the lymphatics, and were encapsulated, showing necrotic centres. Both epididymes showed similar lesions but the testicles were free. There was a large post, pharyngeal abscess, together with caseous cervical, mediastinal and retropharyngeal lymph nodes, miliary lesions in the lung and a small area of caseation in the liver. Smears showed no acid-fast bacilli, but histological studies showed typical tuberculous inflammation in every instance, and guinea pigs inoculated with material from the abscess and the mediastinal nodes developed tuberculosis; inoculations of material from the subcutaneous nodules produced no effects. Tuberculous epididymitis is rare in animals. It is difficult to explain why the animal failed to react to tuberculin even before it became very ill. It is suggested that the disease may sometimes appear without producing a sensitiveness to tuberculin or that different strains of bacilli may not produce the same degree of hypersensitiveness.—*Interesting Case of Tuberculosis with Lesions in the Subcutaneous Tissue and Epididymes, F. Boerner, Jr., and V. G. Kimball, J. Am. Vet. Med. Ass., March, 1923, lxii, n. s., xxv, 751.*

**Formol Reaction with Sera of Tuberculous Cattle.**—The serum reaction of Gaté and Papacostas, that is, the production of a gell by the addition of formol, was studied in serum from healthy and tuberculous cattle, in animals with chronic hypertrophic enteritis and in animals inoculated with timothy bacilli. The reaction is apparently not specific, but the formation of a gell is probably due to unstable equilibrium of the serum colloids. Heat and aging of the serum increase the frequency of the reaction. It is not of diagnostic value for bovine tuberculosis.—*La formolgélification des serums de bovidés tuberculeux, L. Panisset and J. Verge, Compt. Rend. Soc. d. Biol., July 22, 1922, lxxxvii, 667.*

**Similar Distribution of Tuberculosis of Cattle and Fowls.**—Inspection of the fowl and game exposed for sale in the Paris central market has shown that departments where bovine tuberculosis is rife send the highest percentages of tuberculous fowls. A large part of the food of these fowls consists of buttermilk and cheese. These they share with the pigs, animals also frequently tuberculous. Of the fowl from foreign countries the percentage of tuberculosis is considerable only in those from Holland, where the combination of chicken raising and dairying is much the same as in France. Statistics covering the years 1908 to 1913 show a constant increase in the number of condemned fowls; the increase is due partly to improvement in methods of inspection and partly to larger shipments from regions where there is much tuberculosis.—*Étude statistique et étiologique de la tuberculose aviare, Chretien, Germain and Raymond, Rev. d. l. Tuberc., October, 1922, iii, 500.*

**Bovine Actinomycosis.**—The life history of the microörganism is practically unknown. Medical opinion is inclined to the view that it leads a saprophytic existence upon the alimentary mucosa, whereas veterinarians believe that it leads an active existence on vegetable matter. On some farms the disease is more prevalent than on others, and climatic conditions appear to exercise a controlling influence on the growth of the fungus. A dry season is usually followed by a marked decrease in the incidence of actinomycosis. The region of the head and neck in cattle being the most common seat of the disease strongly suggests that the germ is ingested with the food. The internal organs are also occasionally infected. In the lungs the disease may simulate the miliary form of tuberculosis, the nodules being of a grayish-yellow color, or large purulent cavities may develop in the parenchyma. The disease is best treated by autogenous vaccines. The initial three or four doses are sterile, the succeeding half dozen attenuated while the subsequent doses are virulent. Salts of iodine also act therapeutically.—*Bovine Actinomycosis, Its Pathogenesis and Treatment by Vaccines, W. M. Scott, Brit. M. J., December 16, 1922, no. 3233, 1163.*

**Spontaneous Pulmonary Tuberculosis in Offspring of Tuberculous Rabbit.**—Of 4 rabbits, born eight days after their mother was inoculated with tuberculosis, 3 developed pulmonary tuberculosis with lesions which resembled those observed in human infants, but were entirely different from lesions that occur in rabbits during an experimental tuberculosis. These rabbits had been in contact with their mother for thirteen days, but she did not cough and her autopsy showed only very early lung lesions with caseation barely beginning. Rabbits frequently remain in contact with a mother having advanced cavity lesions, but without showing any signs of contagion; contagion seems to play no rôle in tuberculosis of rabbits. Inoculation by the respiratory tract appears, therefore, an unlikely explanation of these cases. Two other possibilities exist: ingestion or placental infection. The rabbits were suckled for thirteen days, but, as the milk or the mammary glands were not examined, there was no evidence in favor of one more than the other of these possible modes of infection.—*Trois cas de tuberculose spontanée dans la progéniture d'un lapin granulique, E. Couland, Section d'études scientifiques de l'oeuvre de la tuberculose, May 13, 1922, reported in Rev. d. l. Tuberc., August, 1922, iii, 411.*

**Complement Fixation in Tuberculosis of Dogs.**—The sera of 9 tuberculous dogs gave 8 positive reactions and the sera of 13 healthy dogs all gave negative reactions.—*La réactions de fixation dans le diagnostic de la tuberculose des carnivores domestiques, J. Verge, Compt. Rend. Soc. de Biol., February 10, lxxxviii, 325.*

**Simple Respiration Apparatus.**—To aid in introducing to medical students the fundamentals of gaseous metabolism measurements, a simple type of apparatus is described, involving the breathing of a confined volume of oxygen-rich air and measuring exactly the amount of oxygen absorbed by the lungs of the subject. The apparatus lends itself also to the determination by students of the vital capacity.—*A Student Form of Respiration Apparatus, F. G. Benedict and Cornelia G. Benedict, Boston M. & S. J., April 19, 1923, clxxxviii.*

**Effects of Anesthetics on Lungs.**—Fleming has collected an interesting series of experiments, showing the detrimental effects of anesthetic vapors on tissue and microörganisms, and has stressed the possible irritating effects on lung tissue. It does not, however, seem to be appreciated that actual damage to the lung tissue as well as irritation may occur. Until recently, the function of the bronchial muscles has been largely ignored, and the physiology of the pulmonary circulation avoided. Sharpey Schafer has recently found that the effect of drugs which act on the circulation is greatly modified by anesthesia, and that this accounts for certain contradictory findings of pharmacologists. There is good evidence that adrenalin constricts the pulmonary as well as systemic vessels, but its pulmonary effect may be prevented while the systemic effect remains unaffected. It has been shown that the action of amyl nitrite on the pulmonary circulation can be prevented by deep anesthesia, probably by direct effects on the contractile tissues. Strips of muscle esposed to chloroform vapor are rapidly killed and might readily be affected by deep and prolonged anesthesia. Certainly the function of the bronchioles is abolished, the muscles or nerve supply probably being paralyzed by direct absorption, since the vagus no longer causes bronchiole constriction; likewise, the action of adrenalin on the bronchioles may be prevented. The mere loss of this protective mechanism must expose the lung to possible damage. Delayed chloroform poisoning may conceivably be due to the absorption of toxic products from dead tissue. We are still without an ideal general anesthetic. Deep or pro-

longed anesthesia should be avoided whenever possible, especially with chloroform, and narcotics used more extensively to supplement the anesthesia.—*The Effect of Anesthetics on the Lungs, R. J. S. McDowall, Brit. M. J., January 13, 1923, no. 3237, 61.*

**Antiseptics in Upper Air Passages.**—As a study of the literature cast some doubt on the value of antiseptics as determinators of bacteria in the upper air passages, experimental work was done to obtain more exact bacteriological information. Certain antiseptic drugs used by rhinologists were studied. These were potassium permanganate, silver preparations, mercurochrome and meroxyl. The general procedure was to culture an area of normal mucous membrane (the tongue), apply the drug, wash the surface free from the latter and again culture to determine what modifications in bacterial flora might result. In no case was it possible to completely sterilize the experimental area, although after treatment with 1 to 10,000 potassium permanganate for ten minutes very few microorganisms were recovered. The results with the other drugs were most unsatisfactory. This was also found true when attempts were made to determine the effects of antiseptics on special microörganisms, harbored in a focus of infection such as the tonsil. While it was possible in some cases to modify the bacterial flora by intensive treatments, no essential or permanent alteration could be produced. Previous work has shown that the microorganisms grow not only on the mucous membrane but in the superficial layers as well. It seems unlikely, therefore, that chemicals applied to the mucous surfaces could effect sterilization without destroying the superficial layers of the epithelium at the same time. It may be possible that inflammatory processes due to some unknown type of virus (colds, pharyngitis, rhinitis) are affected by antiseptics in a manner different from those due to known bacteria, or it may be that a beneficial effect indirectly follows irritation, hyperemia or ischemia produced by the drug. But if drainage, a wet dressing and perhaps stimulation are desired, it may be that in coryza, pharyngitis, etc., better results will follow the use of bland washes, such as salt solution, and drugs which aid drainage by shrinking the mucous membranes, such as cocaine and adrenalin, rather than the strong and irritating antiseptics, such as silver and mercury.—*The Effect of Antiseptics on the Bacterial Flora of the Upper Air Passages, A. L. Bloomfield, Bull. Johns Hopkins Hosp., February, 1923, xxxiv, 65.*

**Primary Infection Tuberculosis in Adult.**—A young married woman of twenty-two years was admitted to the hospital with severe disease of the lungs simulating pneumococcus pneumonia. She died suddenly during a pleural puncture, and the autopsy findings strongly suggested primary tuberculous infection. The authors discuss primary infection of later life in previously unexposed native black races, and argue that there must be a relatively small number of individuals among adult whites who for one reason or another have escaped primary infection. Such a case they presume their own to be for several reasons: 1. No lesion could be found outside the thorax, despite a most careful search. 2. The lungs were strikingly like those of infants dying of acute tuberculosis, in that they were free from any evidence of sclerosis, that almost all of the lung parenchyma was invaded by bronchopneumonic nodules, and that the latter in the right middle lobe resembled a mass of caseous pneumonia. Furthermore, these nodules were in various stages of caseation, but not one of them had evacuated itself to form a cavity. The primary inoculation tubercle was represented by a small caseous nodule in the right upper lobe adjacent to the fissure. There was, however, no corresponding caseous node to be found among the tracheobronchial lymph nodes. 3. Histological examination failed to reveal any evidence of an old lesion, either in lungs or lymph nodes. The lesions were in all respects like those of an acute tuberculous bronchopneumonia. 4. The absence of tubercle bacilli from the sputum would point to the nonexistence of earlier and open lesions. 5. Finally, the history of the case with its abrupt onset, its extreme gravity and the fact that nothing in the patient's past history suggested tuberculosis was further evidence. One point, however, lacked explanation, namely, that one child had died at six months of tuberculous meningitis, although the father was a well man. It is admitted that the proof of the primary nature of infection in this case is not absolute, that it would be of greater value if not an isolated example. A plea is made for more careful and systematic autopsies in acute tuberculosis in adult life.—*La tuberculose de primo-infection chez l'adulte, A. Cain and P. Hillemand, Ann. de Méd., January, 1923, xiii, 39.*

**Chronic Pulmonary Miliary Tuberculosis.**—The pulmonary form of acute miliary tuberculosis is the most rapidly fatal of all types of phthisical lesions, the characteristic symptoms being prostration, cyanosis and dyspnea. A form of chronic pulmonary

tuberculosis is not infrequently observed in which the miliary tubercles appearing in large numbers are an important element in the infection. They may be found in the upper lobes but are more common in the lower lobes, and only rarely are they diffusely and uniformly scattered. These cases are amenable to treatment and are subject to few exacerbations of activity. Serial roentgenograms may show retrogression of the lesions, as evidenced by clearing of collateral inflammation, fibrosis, partial calcification and apparent resolution. Two case records and six reproductions of roentgenograms are presented. In some cases the onset of the illness is similar to that of acute miliary tuberculosis of the lungs, but later the symptoms subside and the patient improves; it is evident, therefore, that under such circumstances the prognosis is not uniformly unfavorable. Cases of this type are described by Northrup, von Muralt, Bierman and Wallgren. *Conclusions:* 1. In the form of pulmonary tuberculosis described, extensive miliary tuberculization is an important element in the infection, and the chronic form of this affection may possibly be designated as chronic miliary tuberculosis. 2. There is a similarity between the early clinical picture of the acute and that of the chronic forms of pulmonary miliary tuberculosis. 3. The chronic type of this affection is relatively mild and of fair prognosis. 4. A correct diagnosis and a study of the chronic form of pulmonary miliary tuberculosis cannot be made without repeated roentgenographic observations, the physical findings being of little value in either respect. 5. A differential diagnosis must be made between this type of lesion and those caused by acute miliary tuberculosis, pneumokoniosis and pulmonary miliary tumor.—*Chronic Pulmonary Miliary Tuberculosis, B. P. Stivelman and H. Hennell, J. Am. M. Ass., February 24, 1923, lxxx, 536.*

**"Liquefaction Shells" of Caseous Bronchopneumonia.**—The beginning of this severe lesion is seen in clear, oval, elongated or polycyclic islets embedded in the pulmonary tissue surrounding a fibrinocaseous mass, and arranged about it as a sort of border; they are in direct connection with the adjacent caseous lesion and look as if a centrifugal force had propelled them from the caseous mass into the lung parenchyma. At first they contain no bacilli; in their interior is a network of fibrin lying in a very fluid exudate in which float a few cells, mostly large mononuclears in process of disintegration; there are no epithelioid cells. At this stage these pockets might pass as areas of "resolution" were it not that signs of a curative effort, such as hyperleucocytosis and regeneration of epithelium, are entirely lacking. At a later stage the fibrinous network becomes less abundant and the mononuclears much more numerous and more distintegrated. Still later the fibrin has almost entirely gone; a few mononuclears are present; polynuclears appear in great numbers, and little by little the pocket becomes a vacuole surrounded by caseous matter,—a *geode*, which has now become a minute bacillary "cave" leading into the tissue surrounding a consolidated mass. Much more rarely, similar lesions occur in the centre of bronchopneumonic areas, and, not so rarely, in cavity cases with a rapid development; the caseous wall may be penetrated here and there by ampullae thrust into the lung parenchyma which resemble in all respects these liquefaction shells. Cut off as it is from the blood supply, liquefaction in the *geode* is at first no doubt autolytic, and invasion of bacteria and leucocytes complete the process. The regions most affected are old sclerocalcareous and anthracotic cortical lesions of the apex.—*Les "geodes de liquefaction" dans la bronchopneumonie caséeuse (fonte liquéfiante du tissu pulmonaire), M. Letulle, Rev. d. l. Tuberc., August, 1922, iii, 333.*

**Non-Caseous Tuberculous Pneumonia.**—Besides the hepatization of ordinary caseous pneumonia there is a variety of tuberculous hepatization which may set in with all the symptoms of ordinary pneumococcic pneumonia. However, differential features soon appear; the fall of temperature indicates lysis, and after its initial descent the temperature continues to oscillate for a time around a fever temperature. These attacks may occur in the course of frank or masked chronic tuberculosis; in the latter case they are particularly likely to be mistaken for ordinary pneumonia. When these curable tuberculous pneumonias are carefully contrasted with ordinary caseous pneumonia it is found that their clinical symptoms are much the same, the differences being mainly differences of intensity; for an ordinary caseous pneumonia causes profound intoxication and is almost inexorably fatal. The difference in intensity depends upon the extent of lung involvement. The relatively small areas affected in these curable pneumonias were named by Bezançon and Braun *curable tuberculous pneumonic foci*. The "cure" may be permanent or temporary, or the alveolitis may go on to caseation. These facts indicate that tuberculous pneumonia is far more frequent than the study of simple caseous pneumonia would lead us to suppose; in the

opinion of a number of observers it is these pneumonic foci which initiate the ordinary exacerbations which succeed one another in chronic tuberculosis; in their more acute form, in which they may be mistaken for pneumococcic pneumonia, the attacks are but exaggerations of what occurs whenever a chronic tuberculosis is lighted up; that is to say, exacerbations originate in a frank or a masked alveolitis. The facts of pathological anatomy support the conception that in cavity formation the primary lesion is an alveolitis originating along an aerial path; associated lesions may arise by way of the blood. This conception subordinates the rôle of nodular tubercle in the development of chronic pulmonary tuberculosis, and attributes chief importance to inflammation of the parenchyma, such as occurs in caseous pneumonia. The starting point for such a bronchoalveolitis is, according to Letulle and Bezançon, the miliary tubercle and not the more complex focus. Focal infection originating through the blood stream is responsible for pulmonary sclerosis, and probably for small apical foci which become completely cured.—*Hepatisation tuberculeuse pneumonie caseéuse et foyers pneumoniques tuberculeux curable. Origine pneumonique des poussées évolutives de la tuberculose pulmonaire chronique, P. Merklen, Prog. Méd., January 27, 1923, no. 4, 38.*

**Absorption of Tuberculous Exudate in Lung.**—This is primarily an X-ray study which is claimed to demonstrate conclusively that tuberculous exudates are frequently absorbed. Many of the lesions observed were in cases of far advanced disease with tuberculous caseous bronchopneumonia; it is believed that such absorption is more frequent in early apical lesions. A comparison of X-ray findings and autopsy studies, reported previously, justifies the conclusion that caseous bronchopneumonia can be detected from the X-ray plate. Assuming on this basis that the original diagnoses were correct, it was found that tuberculous exudate was absorbed in 59 cases out of a total of 489 observed, a proportion of more than 12 per cent. The sex of the patient seemed to have no influence on the phenomenon. The findings suggest that the change noted is increasingly frequent with advancing age. In the whole group of patients studied, 21.5 per cent were negroes, but of the 59 cases in which absorption was noted, only 2 or less than 2 per cent were negroes. The 59 cases were classified as to degree of absorption of exudates as follows: in 7 the change was slight, in 24 moderate, and in 18 marked. In the remaining 10 the absorptive change was accompanied by advancing lesions in other parts of the lungs. Detailed records of six cases, showing the changes noted, are presented. *Conclusion*: It is regretted that in this study Gardner's work is not verified by pathological research upon human lungs, but it is felt that his statement, "caseous tubercle can heal by resolution and finally disappear completely," is correct; and further, that this frequently occurs in man. Absorption of tuberculous exudate may change a desperate to a more favorable prognosis.—*An X-ray Study of the Absorption of Tuberculous Exudate within the Lung, K. Dunham and Vera V. Norton, Amer. J. Roentgenol. and Rad. Therap., February, 1923, x, 112.*

**Vital Capacity, Stem Height and Standing Height.**—The vital capacities of normal men vary with their sizes, but the measurement of size which furnishes the best standard is still under discussion. Since Dreyer places the highest value on stem height in estimating normal vital capacity, the present study was undertaken for the purpose of comparing it with standing height as a determinant. Observations were made on 400 male students at Stanford University, whose ages ranged between 18 and 30 years. The observed ages for various stem heights were plotted and compared with Dreyer's standard for class A individuals; likewise a curve was plotted for various standing heights. It was found that the coefficient of correlation between standing height and vital capacity was 0.46, and between stem height and vital capacity 0.47, the difference being insignificant. There seems to be no reason for adopting Dreyer's complex formula, at least for adult men, when a linear formula will answer the same purpose.—*The Correlation of Vital Capacity with Stem Height, W. L. Rogers, Arch. Int. Med., March 15, 1923, xxxi, 342.*

**Determination of Lung Volume.**—The need was felt to devise a method which would obviate the old difficulties met with in weak patients and satisfy the desiderata noted in the summary. The calculation of lung volume was based not upon the dilution of one gas but upon the volume ratio of two gases. The subject breathed to and from a spirometer containing oxygen sufficient to satisfy his requirements for the length of the experiment. Added to the oxygen was a known volume of hydrogen, approximating the volume of nitrogen in the lungs. The $CO_2$ was continuously removed by a scrubber of sodium hydroxide shells. After the mixture was complete a sample of the gas was taken from which the $O_2$ and the remaining traces of $CO_2$ were removed by absorption

with sodium pyrogallate. The ratio of $N_2$ to $H_2$ was then determined. From this ratio and the known volume of $H_2$ the volume of $N_2$ (originating from the lung air) was calculated as

$$\text{Vol. } N_2 = \text{Vol. } H_2 \left(\frac{\text{Vol. } N_2 \text{ in sample}}{\text{Vol. } H_2 \text{ in sample}}\right)$$

The volume of $N_2$ in the lungs having thus been obtained, the lung volume could be calculated.

$$\text{Lung Volume } \left(\frac{\text{Vol. } N_2}{0.791}\right), \text{ or } 1.264 \times \text{Vol. } N_2$$

since the nitrogen constitutes 0.791 of the air. Method, technique, apparatus, calculation of dead space in the mixing spirometer and the five-way stop-cock, calculation of residual air, and sources of error are fully discussed and explained with the help of charts and diagrams. *Summary*: 1. A method is described for the determination of lung volume without forced breathing. 2. The method determined total capacity and its subdivisions coincidently. 3. The values obtained were independent of the length of time during which the subject rebreathed after gas mixture was once established. 4. The maximum error of the method is estimated at ± 3 per cent of the lung volume determined. Considerably greater variation from the mean may be encountered, however, because of inconstancy in the lung positions assumed by the patient.—*The Determination of Lung Volume without Forced Breathing, D. D. Van Slyke and C. A. L. Binger, J. Exper. Med., April, 1923, xxxvii, 457.*

**Hepatic Insufficiency in Pulmonary Tuberculosis.**—A study was made of 100 invalids in the Pessac Sanatorium, who fell into three groups, namely, patients with constant hepatic deficiency, those with livers functionally normal and those with transient insufficiency. The investigations extended over a period of four months. The results show that eventually tuberculosis is almost certain to involve the liver and that an hepatic insufficiency lasting for some months indicates a very grave prognosis. The exceptions were cases where a pneumothorax arrested the lung process. When the liver is functionally normal for several months the prognosis is favorable, even though pulmonary lesions be extensive. However, a normal liver is not a guarantee of ultimate recovery, for even without hepatic insufficiency a tuberculosis may be lighted up and take a permanently unfavorable course. Transitory liver insufficiency occurs, as a rule, during a flare up, and it is during repeated exacerbations that the damage is caused which leads finally to permanent insufficiency. In the course of the investigation 12 subjects with pneumothorax were studied who fell into three groups. In the first group were patients with hepatic insufficiency developed during a flare up of a unilateral tuberculosis. Evolution of the disease was not arrested by the pneumothorax, and the liver insufficiency increased. These patients grew progressively worse or died of an acute accident. The second group consisted of patients with chronic unilateral lesions and normal liver function. These cases were successful; the local and general condition improved and the liver function continued normal. In the third group the pneumothorax modified both the tuberculosis and the state of the liver, but in different ways. In one group there was hepatic insufficiency during a flare up, and after pneumothorax both of these disappeared. In the second group the tuberculosis was not progressive and there was no liver insufficiency, but pneumothorax was followed by a flare up, generally with localization in the other lung, and the appearance of hepatic insufficiency. The presence of hepatic insufficiency does not in itself constitute a contraindication to the induction of pneumothorax. In one case, with a rapid process in one lung and with hepatic insufficiency, pneumothorax led to a more chronic tuberculosis and an improvement in the general condition without a disappearance of liver insufficiency. Normal liver function does not suffice as evidence of a favorable prognosis because the liver is only one of many elements concerned in defense. Prolonged functional deficiency is generally associated with a bad general state, and is one of the signs of lowered resistance. As a rule the clinical signs which accompany it indicate that the tuberculosis is evolving toward a fatal termination. Evidence for a prognosis based upon functional integrity or upon transitory insufficiency of the liver was not obtained by these studies.—*L'insuffisance hépatique des tuberculeux pulmonaires, E. Leuret and E. Aubertin, Rev. d. l. Tuberc., October, 1922, iii, 477.*

**Blood Acidity in Tuberculosis.**—The study of pulmonary tuberculosis is too much concentrated upon the lung. The blood and lymph are acid during tuberculosis, particularly at the beginning. The problem of acidosis includes many factors and they all ought to be considered. Do diseases of certain glands, such as the thyroid, liver and parathyroids arouse tuberculosis because they disturb oxidation and thereby increase the acidity of the blood? To seek for and overcome the causes of blood acidity is th-

first necessity. Acidity of the blood must be neutralized in tuberculosis because this interferes with oxidation and reduction, and prevents dehydration of acid aldehydes, glucoses and pentoses. The predominance of free hydrogen ion leads to demineralization of the tissues, with impoverishment in essential basic elements like potassium, magnesium, calcium. Leucocytic enzymes which require a neutral or alkaline medium are inoperative in acid blood, and the destruction of tubercle bacilli is thereby prevented; other catalytic activities are also prevented by an acid medium. The normally constant concentration of hydrogen ions may be increased by insufficient pulmonary ventilation, kidney insufficiency and insufficient alkaline reserve. Muscular exercise diminishes the apparent alkalinity of the blood, and rest for the tuberculous has consequently a chemical basis. A diet too rich in nitrogen increases blood acidity; hence the disadvantages of superalimentation and of too much meat. Hydrocarbons, sufficient for heat production, should be given, so that the acidosis resulting from oxidation of body fats and proteins may be prevented. Gastrointestinal troubles disturb the chemical equilibrium of the blood and this fact explains the improvement which takes place in tuberculosis after relief from digestive disturbances. The acidity of urine is inversely proportional to gastric acidity; the urine is least acid from the beginning of a meal to the end of the first hour and from that time increases as the gastric acidity diminishes. It would, consequently, be important to try the effect of subcutaneous remedies (reducing, oxidizing, proteolytic, lipasic) given an hour after breakfast, which ought to be a light meal. From the standpoint of their chemical behavior the alkaline salts used in the treatment of tuberculosis seem to have been badly chosen. It may be that strongly hydrolytic salts should be used. Salts of very weak acids, carbonates, borates, cyanates, oleates, phenates, are very hydrolytic, and in their solutions hydroxyl ions are free to neutralize the hydrogen ions in an acid medium. It seems also that strong bases should be used, since the strong bases dissociate most. In the elements of the first group are some that it might be best to choose because of a combination of strong basicity and feeble toxicity: lithium, potassium, rhubidium and caesium hydroxides form salts with certain weak acids like boric and oleic. They should be used in weak solutions so as to favor dissociation. Another advantage consists in the circumstance that potassium, rhubidium and caesium salts decrease viscosity; for tuberculous blood is hyperviscous. Basic dyes may also be used to neutralize acidity. Quinoline which lowers acidity by the production of stable salts should be studied. It may also be that certain reactions can be found by which the acid radicles H and COOH can be influenced directly. When an acid takes part in a chemical reaction, through its free acidity one may diminish the concentration of its ions by adding a neutral salt of a weak acid. Formic acid is decomposed in carbonic acid and in water by rhodium black, palladium black, reduced copper, nickel, oxide of glucinium and oxide of manganese. These and many other familiar reactions point to means by which the acid soil might be modified in tuberculosis. A radical reform in diet, based on the chemical consequences of certain foods, is greatly needed. The influence on the blood of all therapeutic measures should be determined electrometrically. Measures which would render the blood permanently neutral would, it seems, constitute a precious therapy, and furnish a starting point for lipasic and proteolytic treatment. The study of blood reaction and viscosity should precede all therapeutic attempts. It was possible to judge of how positive resistance may act in the tuberculous by studying *in vitro* the destruction or nondestruction of tyrosin by glucose through varying the reaction with minimal doses of phosphoric acid. If the acid soil of the tuberculous could be so varied, a refined therapy might be established. Inasmuch as acidity in tuberculous patients may arise from very different causes the cause should be sought for in each case. According as the cause is found to be lack of alkaline reserve, bad pulmonary ventilation or diseased endocrines the clinician must choose his therapeutic procedures.—*La neutralisation de l'acidité sanguine chez le tuberculeux, J. Roux, Section d'études scientifiques de l'oeuvre de la tuberculose, June 10, 1922, Reported in Rev. d. l. Tuberc., August, 1922, iii, 438.*

**Endothelial Reactions.**—Previous studies having shown that the lungs appear to play an important rôle in the production of circulating macrophages (mononuclear phagocytes) in rabbits affected with experimental tuberculous meningoencephalitis, experiments were done with normal rabbits treated in the same way (splenectomized). These rabbits were given the usual ink injections to aid in recognizing the macrophages. It was found that the removal of the spleen throws an increased amount of ink into the other hematopoietic organs and the lung and liver. The liver and bone marrow do not compensate for the loss of

the spleen in removing the ink from the circulation. The lungs appear to play the chief part in the process, slowly passing on the removed material contained in macrophages to the liver or retaining these ink-laden cells in their tissues and capillaries. The lungs remove the foreign material from the circulation by an increase in the capillary endothelium and by a process of engorgement of the capillaries with cells presumably derived therefrom. At the same time there is an increase in the number of ink-bearing macrophages in the lymphatics and capillaries of the lung, indicating that these cells are entering the circulation and the lymph stream. The only organ in which they lodge in any quantities, outside of the peribronchial lymph nodes, is the liver. After the lungs, the liver comes next in the degree of intensity of pigmentation; the bone marrow contains far less than either of these organs.—*Studies in Endothelial Reactions. VII. Changes in the Distribution of Colloidal Carbon Noted in the Lungs of Rabbits Following Splenectomy, N. C. Foot, J. Exper. Med., February 1, 1923, xxxvii, 139.*

**Blood Destruction during Exercise.**—Observations already recorded offer strong evidence for the occurrence of blood destruction during exercise. Any considerable loss of blood from hemorrhage or destruction of cells within the body is followed, in the absence of complications, by a definite increase in the number of reticulated red corpuscles in the peripheral circulation. This reaction, therefore, can be taken as a direct indication that unusual demands for new cells are being made upon the hematopoietic tisues. Experiments with dogs showed that a definite increase in the percentage of reticulocytes occurs after exercise in animals previously kept to a sedentary life. Concomitant changes in the hemoglobin percentage, plasma cell ratio, red count, etc., offer evidence of an increase in blood destruction under such circumstances. Replacement by transfusion prevents the reticulated cell reaction. Animals rendered plethoric and then exercised show no increase in reticulated cells while the plethora persists. The fact is emphasized that exercise must be an important factor in the maintenance of an efficient hematopoietic tissue.—*Blood Destruction during Exercise. III. Exercise as a Bone Marrow Stimulus, G. O. Brown, J. Exper. Med., February 1, 1923, xxxvii, 187.*

**Blood Destruction during Exercise.**—In normal persons a practically constant balance must be maintained between blood destruction and blood formation in spite of occasional unusual exertions. Previous experiments have shown that this is not the case when animals which have been caged for some months are suddenly subjected to strenuous exercise. In them appears a condition best described as marrow decompensation. Blood is destroyed more rapidly than the hematopoietic tissue can replace it. Experiments were done to determine whether the changes would have occurred had the dogs been trained before entering on so strenuous a test. The results show that animals recently caged do not manifest as large a decrease in cell volume after exercise as those which have been confined several months. When a sedentary dog is exercised continuously, a decrease in cell volume occurs in the first or second week of exercise, but usually by the end of the third week the loss has been made up. Apparently the hematopoietic tissues have adapted themselves to the increased demands made upon them by the hastened rate of destruction.—*Blood Destruction during Exercise. IV. The Development of Equilibrium between Blood Destruction and Regeneration after a Period of Training, G. O. Brown, J. Exper. Med., February 1, 1923, xxxvii, 207.*

**Composition and Volume of Pneumothorax Gases.**—The gas mixture in pneumothorax changes with the development of an exudate. In dry pneumothorax the oxygen is about 3.67 per cent and carbon dioxide about 6.95 per cent. In cases with exudate the oxygen content diminishes and the carbon dioxide increases: not rarely the carbon dioxide content can reach 10 per cent and the oxygen content drop to 1 per cent. An improved method of determining the volume of the pneumothorax is described, based on the measuring of the carbon dioxide content before and after introducing a known quantity of carbon dioxide free gas (an improvement is made, especially in making and correcting the readings, over their original method). Open pneumothorax can be recognized by the high carbon dioxide content being replaced by a high oxygen content (3 per cent or more); withdrawing of the gas causes a further increase in the oxygen content and lowering of the carbon dioxide. The volume and limits of error are figured in 16 pneumothorax cases, being on an average 6.2 per cent and lying between 3.4 and 11.1 per cent.—*Untersuchung über Pneumothorax Gase, Zusammensetzung der Gase und Volummessung. II. Mittl., H. Grass and H. H. Meiners, Beitr. z. Klin. d. Tuberk., March, 1922, li, 134.*

**Hollow Adhesion Communicating with Tuberculous Cavity.**—Section of an adhesion near the rib showed a hollow which

led directly into a large apical cavity. The tunnel in the adhesion could not have been shown by the radioscope, and section of the adhesion by means of the electrocautery method described by Hervé would have opened a large tuberculous cavity into the pleural space. Because this case is probably not exceptional, as well as because of its other defects, the method proposed by Hervé ought to be practised very seldom; in most cases where section of an adhesion is necessary surgical intervention is to be preferred, in spite of its dangers.—*Brides adhérentielles et pneumothorax artificiel.—Presentation de pièces, E. Rist and J. Rolland, Section d'études scientifiques de l'oeuvre de la tuberculose, June 10, 1922, Reported in Rev. d. l. Tuberc., August, 1922, iii, 436.*

**Permeability of Intestinal Mucosa to Bacteria.**—Observations were made on dogs with thoracic duct fistulas. *Conclusions:* 1. It is not possible to recover Bacillus prodigiosus from a fistula of the thoracic duct by culture of the lymph after ingestion of the microörganism. 2. The negative results were not influenced by diet or by trauma due to exposure of the viscera or to standard operative procedures. 3. Cultures of the feces for the ingested bacteria were negative. 4. Cultures obtained from the thoracic duct following injection of the bacteria into the peritoneal cavity were positive in 50 per cent of the experiments of one group.—*The Permeability of the Intestinal Mucosa to Certain Types of Bacteria, Determined by Cultures from the Thoracic Duct, C. S. Williamson and R. O. Brown, Am. J. M. Sci., April, 1923, clxv, 480.*

**Bacterial Hypersusceptibility.**—This article is a direct continuation of the work published in 1921 by one of the authors, in which it was shown that intracutaneous and presumably, also, general tuberculin reactions could be distinctly differentiated from true anaphylaxis to tuberculoprotein. In the present study, ground influenza and tubercle bacilli, pneumococcus and staphylococcus were treated as usual by alkaline extraction, subsequent precipitation of acid-precipitable material, filtration, boiling in acid state, and refiltration. Treatment of this final filtrate ("residue") with alcohol resulted in a small amount of alcohol precipitable material which is apparently free from coagulable protein, is specifically precipitable by homologous antiserum and gives specific complement fixation reactions. These acid and heat-resisting antigenic materials are believed to be analogous to tuberculin and to the pneumococcic substances of Dochez and Avery. The stability of these substances is considerable, especially the pneumococcus and tubercle bacilli residue antigens, which resisted boiling and autoclaving both when acidified and alkalized. However, attempts to produce antibodies in animals by injecting these residues failed, and this strongly suggests that the substances are antigenic only in the sense that they are able to react with antibodies but are themselves incapable of inciting antibody production. Skin reactions with staphylococcus and pneumococcus residue in animals infected with the above microorganisms have specific reactions which indicate that, apparently, complete analogy exists between these reactions and the tuberculin rection. In guinea pigs in which the infectious agent formed foci in the body, infection is followed within a variable, but relatively short time (5 days to 2 weeks), by a type of hypersusceptibility, which is distinct from protein anaphylaxis and which may be determined by intracutaneous skin reaction. As the substances leading to various forms of specific hypersusceptibility in the animal body become simpler in structure, they may fail to induce typical antibody production and, by gradually increased diffusibility, transfer the reactions from the cell surface to the interior of the cell. The extremes of the scale of differences would be represented by protein anaphylaxis, on the one hand, and drug idiosyncrasies on the other.—*Further Studies on Bacterial Hypersusceptibility. II, H. Zinsser and Julia T. Parker, J. Exper. Med., February 1, 1923, xxxvii, 275.*

**Immunization in Tuberculosis.**—While the majority of people become infected with the tubercle bacillus, only a comparatively small percentage of them develop diagnosticable disease. What is the cause of this resistance and how can it be obtained? Much has been done by the improvement of hygienic surroundings but it seems impossible by this method to prevent the bacillus gaining access to the individual. Inherited low resistance, virulence of infection, familial infection and intercurrent disease aid the development of tuberculosis. The author believes that there is only one certain method of making sure that the resistance of every member of the community is normal and that is the immunization of every individual in the community with an antigen of the tubercle bacillus. This antigen consists of a solution of the tubercle bacillus in benzoyl chloride, a preparation which contains all the constituents of the bacillus. Distinct reactions have been obtained with a dose of 0.00000001 mgm. actual weight of moist tubercle bacilli; hence it is a most potent antigen. This is the initial dose used in cases running fever. For prophylactic purposes in infants the dosage ranges from 0.000001 to 0.001 mgm.

and four or five injections are given. Additional doses of 0.01 and 0.1 mgm. may be given older children and adults. If any of these doses should cause either a focal or a general reaction it is proof positive that the individual is suffering from active tuberculosis. The inoculations cause no sore arms; a reaction is indicated merely by a feeling of malaise and a slight rise in temperature. The treatment of suspected cases in which a reaction is obtained is a simple one, necessitating the use of a tubercle bacillus antigen alone. It is unfair to judge this antigen by the general difficulty of obtaining with any antigen in laboratory animals sufficient immunity to withstand intravenous or subcutaneous injections of virulent tubercle bacilli. For never does any human being receive a dose of 0.1 mgm. of virulent tubercle bacilli intravenously or subcutaneously. In support of the above method of immunization the author admits that he can give no adequate figures although he does not know of a case of a member of a tuberculous family so immunized to develop tuberculosis. A plea is made for the more general use of his measures.—*The Prevention of Tuberculosis, W. M. Crofton, J. State Med., February, 1923, xxxi, 74.*

**Histology of Pirquet Lesion.**—The lesion of a positive Pirquet reaction gives a histological picture of a mononuclear cell infiltration in the superficial connective tissue. Immediately below the Malpighian layer are numerous lymphocytes, some scattered, some aggregated. The tissue is edematous and the blood vessels slightly congested; small hemorrhages may be present. This picture is quite different from the lesion present in a positive luetin test which is characterized by polymorphonuclear infiltration in the deeper connective tissue of the skin.—*The Histopathology of Cutaneous Tests, A. Strickler and E. J. Asnis, Arch. Dermatol. & Syphilol., March, 1923, vii, 379.*

**Toxicity of Tuberculin.**—An extensive review of this subject and a criticism of Neustadt and Stadelmann's work are given. Promiscuous tuberculin injections may be very injurious. Diagnostic tuberculin injections when used carefully are absolutely harmless. Subcutaneous tuberculin test is a reliable diagnostic procedure. The specificity of the tuberculin reaction is an established fact.—*Zur Toxicität verschiedener Alttuberkuline und zur Frage der Tuberkulinschädigung durch diagnostische Dosen, Schwermann, Ztschr. f. Tuberk., October, 1922, xxxvii, 37.*

**Specificity of Tuberculin Reaction.**—The reactions, both systemic and focal, which follow the injections of proteins and tuberculins are very similar clinically, the difference being one of degree only. Both proteins and tuberculins should be regarded as "stimulating bodies," which cause inflammation of susceptible tissues. However, the reaction, focal and systemic, obtained by injection with tuberculin is very much stronger than that obtained by proteins, as was shown by the author in his experimental work on the eye.—*Zur Specifität der Tuberkulinreaction, G. Tobias, Klin. Wchnschr., December 23, 1922, i, 2571.*

**Function of Leucocytes in Tuberculosis of Guinea Pig.**—The normal leucocyte formulas in man and the guinea pig are very different; for the latter an average formula is as follows:

| | *per cent* | |
|---|---|---|
| Lymphocytes | 33.6 | 51.2 |
| Transition forms | 17.6 | |
| Large mononuclears | 16.5 | |
| Total mononuclears | 67.7 | |
| Polynuclears with 1 and 2 nuclei | 11.4 | |
| Polynuclears with 3 nuclei | 10.3 | |
| Polynuclears with 4 nuclei | 5.0 | |
| Polynuclears with 5 and 6 nuclei | 3.9 | |
| Eosinophiles | 5.5 | |
| Basophiles | 1.± | |

The lymphocytes and the transition forms are counted together because the two groups are hard to distinguish. The large mononuclears, often very massive, are more typical of the very large ones, 15 to 20 per cent have a great central vacuole containing a strongly staining substance which suggests nuclear and red debris, and gives the impression of phagocytic activity. Romalo and Gorescu produced tubercles in guinea pigs by injecting defatted bacilli or irritant powders and afterward, by injections of potassium iodide, they produced great phagocytic activity in the large mononuclears. These then invaded the tubercles and distributed the defatted bacilli or the irritant powders throughout the body, where they gave rise to new tubercles which lasted till the irritating materials were completely digested. It may be supposed that the great phagocytic activity of the large mononuclears in the guinea pig leads, in case of tuberculous infection, to a rapid distribution of the tubercle bacilli, and that the mononuclears, not being able to destroy them, simply hasten their dissemination and create the conditions for a generalized tuberculosis.—*Formule leucocytaire et sensibilité du cobaye à la tuberculose, Berthelon and Delbecq, Section d'études scientifiques de l'oeuvre de la tuberculose, May 13, 1922, reported in Rev. d. l. Tuberc., August, 1922, iii, 414.*